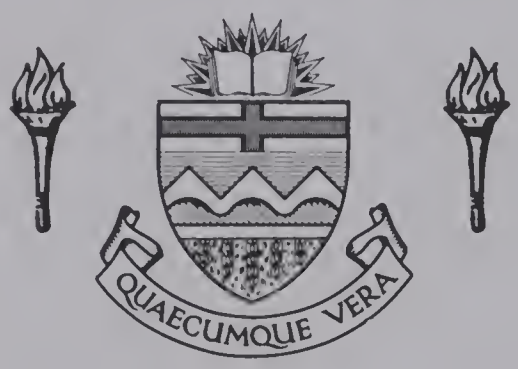

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MARRIED FEMALE LABOUR FORCE PARTICIPATION AND FERTILITY IN CANADA

by

AGAMPODI SANGADASA

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Married Female Labour Force Participation and Fertility in Canada", submitted by A. Sangadasa in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Sociology.

ABSTRACT

New economic theory of fertility predicts an inverse linear relationship between wife's education and completed fertility. Economists however, are 'puzzled' by the finding that the empirical relationship is actually non-linear. More to their surprise, there seems to be an upturn of fertility at the highest level of wife's education. Some economists suggest that this empirical observation is due to the interaction of wife's education with her work status where working wives acting according to the predictions of the economic model and highly educated non-working wives having higher completed fertility than their less educated sisters. Analysis of sample data from the 1971 Canadian census indicates that wife's education does interact with her work status in producing fertility but it is the working wife who tends to have higher fertility at the higher levels of education while the highly educated non-working wive continues to have lower fertility than her less educated counterpart. It is argued that the upturn of fertility at the higher levels of education among working wives, and the non-linearity of education-fertility profile in the general case, are phenomena predictable by a model based on socio-economic theory.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

CHAPTER 1

INTRODUCTION

Canadian women have shown a dramatic increase in the labour force participation during the last two decades. In 1951, women accounted for 22.0% of the labour force; by 1971 their share had increased to 34.3% of the labour force. Even more dramatic is the increased labour force participation of married wives. As shown in Table 1, the proportion of wives in the female labour force increased from 30% to 60% during the twenty years period between 1951 and 1971. Married female labour force participation rate stood at 36.9% in 1971--an increase of 25 percentage points from 1951.

The labour force status of married women affects their entire way of life and their role in society. Social scientists have studied this phenomenon from a number of perspectives.

1. Economists have done much work on employment of married women with a primary focus on labour supply (Long, 1958; Mincer, 1962; Cain, 1966; Bowen and Finegan, 1969; Nakamura et al., 1979). The effects on wage rates, distribution of income, mobility patterns and general economic growth have been studied and well documented.
2. Social psychologists and various family sociologists have focused their studies on the ways in which work by the wife influences the marital relationship, and psychological

and social development of her children (Nye and Hoffman, 1963).

3. The major concern of Canadian students has been the determinants of female labour force participation in general (Allingham, 1967; Ostry, 1968) and the determinants of married female labour force participation in particular (Allingham and Spencer, 1968; Spencer and Featherstone, 1970).
4. The popular concern among demographers and some economists has been the relationship between fertility and employment. As the title of the thesis suggests, this study represents yet another attempt to explore the fertility-employment relationship.

The purpose of this thesis is to examine fertility differentials by employment status of married women in Canada. It is generally known that cross sectional demographic studies are unable to provide any firm conclusions about the causal relationship between work status of wife and her fertility. However, from census data one is able to examine various questions such as: Does the wife's employment make a difference with respect to fertility? If so, how does the employment make a difference and how much difference does it make?

Past research on this subject can be conveniently categorized into the following two groups:

1. Cross sectional research to show the mere existence of a

significant relationship between fertility and employment of wives. In this category one finds cross cultural studies (Adelman, 1963; Heer, 1966; Friedlander and Silver, 1967), as well as national and subnational studies (Blake, 1965; Collver and Sanglovis, 1962; Collver, 1968; Duncan, 1966; Freedman, Whelpton and Campbell, 1959; Hathaway, Beegle and Bryant, 1969; Havens and Gibbs, 1975; Heer, 1966; and Turner, 1965; Goldstein, 1972; Kupinsky, 1971; Stycos and Weller, 1967; Urlanis, 1967). The conclusion of all these studies has been the same: there exists a significant negative association between fertility and female labour force participation.

2. Studies to explore why such a relationship should exist. The focus of these studies has been to provide an explanation as to the negative association between fertility and female employment. However, as many students have already noted (Sweet, 1973; Hawthorn, 1970) "empirical research from this perspective has thus far been inconclusive and unsatisfying" (Sweet, 1973, p. 26). As a matter of fact, most of the explanations that have been suggested have not been subjected to empirical testing; thus they remain mere speculative statements.

In this thesis, an attempt is made to answer the following specific questions:

(a) In Canada, what is the nature of the relationship between the labour force status of women and their fertility? How strong is this relationship?

(b) Could the relationship between married female labour force participation and fertility be spurious?

(c) If the above relationship is not spurious could there be any other explanations for this relation?

1.1 Organization of the Thesis

Chapter Two is devoted to the review of relevant literature on the subject. A description of the data, the variables used and the methods of analysis employed is provided in Chapter Three. The results of a preliminary examination of the wife's employment-fertility relationship is documented in Chapter Four. Chapter Five provides a test for the spuriousness hypothesis. Data are further analysed in a socio-economic interaction framework and the results are presented in Chapter Six. The final chapter provides a summary of findings and the theoretical implications of the study to the broader subject matter.

CHAPTER 2

REVIEW OF RELEVANT LITERATURE

According to Judith Blake (1965), the association between married female labour force participation and family size is one of the strongest, most persistent over time and space, and most theoretically reasonable in the field of social demography. The evidence for the existence of a negative relationship between female employment and fertility is truly overwhelming. According to Kupinsky (1977) to discuss the studies dealing with the negative relationship between female work and fertility "one would need an annotated bibliography such as Freedman's (1961, 1975) or a work similar to Hawthorn's (1970)" (p. 196).

In spite of this overwhelming observed evidence for the existence of this relationship, there still remains the problem of explanation as to why such a relationship should exist. Attempts at resolving this problem have come from three fields of social sciences: Demography, Sociology and Economics. The approach taken by demographers has been one of fact finding rather than theorizing. The emphasis has been to explain the primary relationship with the help of background or exogenous variables. The obvious null hypothesis has been that the primary relationship is spurious. In other words, the primary negative relationship is produced by a host of background variables which selectively determine both the

degree of female employment and the level of fertility.

The second G.A.F. study reported that working women expected fewer children than non-working women but about 55% of the women who had been working for 4.5 years or more were sub-fecund (Whelpton, Campbell and Patterson, 1966). Hawthorn (1970) suggested that this may well explain the observed negative relationship between female employment and fertility. Several researchers tested the null hypothesis that the negative relationship between female employment and fertility is due to sub-fecundity, and found strong reasons to reject it (Ridley, 1959; Pringle, 1967; Kupinsky, 1971; Weller, 1976). Similarly, some researchers report that religious groups characterized by high fertility are less affected by female employment than those with low fertility (Henripin, 1968; Bowes and Hasting, 1970). Ridley (1959) and Ryder and Westoff (1971) however, were unable to observe such differentials due to religious affiliation. There is evidence for the existence of a strong negative association between female employment and fertility even after controls were introduced for socio-economic status (Ridley, 1959; Weller, 1976), age (Ryder and Westoff, 1971) and marriage duration (Kupinsky, 1968; Weller, 1976).

Among the variables which are known to contribute toward the negative association between female employment and fertility are education (Henripin, 1968; Namboodiri, 1964; Pringle, 1967; Sweet, 1970; Mott, 1972), ethnicity (Ridley, 1969; Terry, 1974; Preiser, 1974), place of residence (Henripin, 1968), occupation (Preston and Richards, 1975; Oppenheimer, 1976; Dixon, 1975; Mason, 1974),

economic need (Sweet, 1970) and the relative contribution of wife's employment income (Haven and Gibbs, 1975).

2.1 Sociological Approach

The sociological perspective differs from the demographic perspective in that the latter places emphasis on fact finding and classification, whereas the former places emphasis on theorizing. Within the sociological perspective there are two interrelated but analytically different explanations to the negative association between female employment and fertility: the role incompatibility explanation and the sex-role orientation explanation.

Assumed in the role incompatibility explanation are the notions of normative role conflict and role conflict of allocation (Terry, 1974). According to the normative role conflict hypothesis, the society expects a woman to be a mother rather than a worker, and an employed mother of young children is in conflict with this normative explanation, unless she is working out of economic necessity (Mason and Bumpass, 1975). This hypothesis predicts that working women will attempt not to have children or women who have young children will tend to withdraw from the labour market. Some researchers question the validity of the assumption that there exists a normative orientation in that the working mothers are frowned upon. In the industrialized world, the proportion of working mothers with young children entering the labour market has increased dramatically during the last two decades (Kupinsky, 1977; Young, 1973). The reasons

for working are not necessarily financial ones (Hoffman, 1963). Bancroft (1958), in her detailed study on the U.S. labour force found that labour participation rate is greater among the upper class females. According to Lebergott (1960) it is the need for keeping up with the Joneses that makes females participate in the labour force:

> On the supply side, the incentive is to be found in the dazzling array of material goods now incorporated into the American standard of living (p. 400).

A social study of York revealed that the practice of supplementing the family income by paid full or part-time work of married women "appears to be especially prevalent among the best-off sections of the working class" (Myrdall and Klein, 1956, p. 54). Among Lancashire working mothers in 1950, more than 65% went to work for reasons other than financial needs (Zweig, 1952). In the United States, the more important motivations for mothers to work include liking work (Hoffman, 1961), need to achieve (Sobol, 1963), desire to escape the boredom of home, and intellectual stimulation (Beckman, 1963). Clearly, the industrailized western society is more permissive toward the mothers employment than the normative role conflict hypothesis suggests. In many non-industrialized third world countries there does not seem to be any normative conflict between the mother role and the worker role.

> If there were any inherent incompatability between female labour force participation and high fertility levels, then Africa should have fertility levels appreciably lower than the rest of the developing world (Ware, 1977, p. 1).

Helen Ware (1977), after analyzing literature and data for twenty-six African countries, comments:

> The most important conclusion to be drawn from the available African data is that it is indeed possible to maintain very high levels of fertility even where the vast majority of the adult female population are participants in the work force (p. 2).

According to Ware (1977) this non-existence of a normative role conflict between female employment and rearing children in Africa is true irrespective of the place of residence, social class or occupation.

According to Stycos and Weller (1967) the observed inconsistency in this relationship between the developed and developing countries is due to the role conflict of allocation rather than the normative role conflict. In traditional settings where cottage industries prevail and the social organization is of the extended family, the roles of mother and worker can be easily combined. Many researchers have commented that in such a situation the fertility of working women is hardly different from that of non-working women (Stycos and Weller, 1967; Weller, 1967; Stycos and Back, 1964; Gendell, 1966; Collver and Langlois, 1962; Klein, 1965). Although this hypothesis does seem to help explain the cross-cultural variations in the relationship between female employment and fertility, there remains the problem of measuring role conflict and evaluating its impact on fertility (Kupinsky, 1977). This hypothesis remains speculative in nature and there is hardly any empirical research to support or refute it. Another problem associated with this concept

is its inability to predict the behavior of the individual. In conflict situations it does not predict which role will take precedence (Davidson, 1977).

2.2 Sex Role Orientation

According to this hypothesis, there are two types of sex-role orientations: modern and traditional. Wives who have a modern sex-role orientation work because they want, to, have considerable work experience prior to marriage, do not feel that they must explain their non-familial worker role, openly discuss matters pertaining to contraception and family size with their husbands and likely to feel work as an alternative to motherhood (Mason, 1976; Clifford, 1971; Weller, 1968; Rosen and Simmons, 1971; Michel, 1970). Traditional women, on the other hand, view non-familial work as a legitimate alternative to the homemaker role only if the economic need exists, are employed in occupations which are not considered gratifying, and are likely to find satisfaction in bearing numerous children (Stycos and Weller, 1967; Blake, 1972; Hoffman and Hoffman, 1973; Kelly, 1973). According to Scanzoni (1975), the sex-role orientation approach explains not only the cross-sectional differences of fertility among the working women but also the fertility decline in the 1960's and 1970's in the Western world. Scanzoni presents data to show that working wives have significantly higher scores of modernity, more confident of their own abilities and desire fewer children than non-working wives.

Proponents of the sex role orientation thesis believe that it is the work commitment rather than working per se that results in lower fertility. Work commitment is measured in various ways by various students but with the exception of Mason (1974), everybody seems to have found a strong negative association between work commitment and fertility. Safilios-Rothschild (1969, 1970, 1971, 1972) has done a considerable amount of work both in the construction of a work commitment scale and in the application of same in fertility research. According to Safilios-Rothschild the crucial variable in the female work-fertility relationship is the degree of work commitment on the part of the working woman. Others who employed a measure of work commitment to explain the work-fertility relationship include Sobol, 1973; Fortney, 1972; Kupinsky, 1971; Fogarty et al., 1971; Mason, 1976).

Related to the work commitment hypothesis is the gratification-motivation hypothesis. Many who investigated the work-fertility relationship agree that gratifying and rewarding employment result in lower fertility (Freedman and Coombs, 1966; Fortney, 1972; Haven and Gibbs, 1975; Hoffman and Hoffman 1973; Ryder and Westoff, 1971; Safilios-Rothschild, 1970, 1972; Wolfe, 1975). This hypothesis is supposed to explain why white collar workers who deal with symbols and ideas (Kohn, 1966) have lower fertility than blue-collar workers who deal with manipulatory objects (Collver and Langlis, 1962; Fortney, 1972; Weller, 1967). This is also supposed to explain fertility differentials between those who work because of financial

reasons and those who work for other than financial reasons (Hass, 1972; Dixon, 1973, Scanzoni, 1975).

In summary, the sex role orientation approach predicts that the key factor that helps understand the fertility behavior of working women is their sex role orientation rather than their employment status. Role-modern working women have lower fertility than role-traditional working women. In other words, fertility differentials among working wives should disappear if proper controls are introduced for sex role orientation.

As mentioned earlier, there are many proponents of the sex role orientation perspective. However, a rigorous empirical examination of this hypothesis is yet to be seen. Obviously, the fact that the white collar workers in a certain city have lower fertility than the blue collar workers does not prove or disprove the validity of the sex role orientation perspective. An acceptable test of the hypothesis involves the operationalization and measurement of the degree of sex role orientation and relate this measurement to an indicator of fertility. The most popular measures of sex role orientation have been education (Mason, 1976), age (Stolzenberg and Waite, 1975), occupation (Han, 1976; Weller, 1967), length of work history (Mason and Hodgson, 1976) and use of contraceptives. There are, no doubt, fertility differentials by education, age, occupation, work experience and contraceptive use. These differentials, however, do not necessarily prove the validity of the sex role orientation hypothesis.

Proponents of the sex role orientation framework have limited their research to analyze fertility of working wives and have completely ignored an examination of the fertility differentials between working and non-working women. It seems that they have considered the following as known facts: All women who do not work have very high fertility and there is a clear causal link between "modern" employment and fertility. This is clearly shown in Kupinsky's policy statement:

> If we are to maintain the current low levels of fertility in the United States and eventually reach zero population growth, then it is essential that we provide women with opportunities to develop modern sex role orientations through education, training, and acquired technical skills" (1977, p. 223).

Obviously, there are fertility variations among the non-working as well. It is quite conceivable that some working women have more children than some non-working women. One could argue that work is only one indication of modern sex role orientation but there are many other indicators which are applicable to both the working and the non-working women, and the fertility differentials in the general population are due to different sex role orientations irrespective of the employment status of the women. A test of such an argument would entail classification of the female population according to the sex role orientations and analysis of the employment-fertility relationship within such classifications. If the sex role orientation is the explanation for the employment-fertility relationship, within a group of women who subscribe to similar sex role orientations there

should not be a fertility differential by work status. What is proposed here is a test for the spuriousness of female employment-fertility relationship. Chapter Five of this thesis presents results of an empirical investigation based on a similar research design.

2.3 Economic Perspective

The new economic theory of fertility has as its base the early work of Becker (1960) who introduced a utility maximization model to analyze the demand for children. According to this framework, children are not different from consumer durables and therefore the number of children demanded depends on their relative price and constraints of household income. This theory predicts that, other things being equal, there should be a positive correlation between the level of household income and fertility. In the 1960's there was no evidence for such positive income effect. Becker (1960) argued that parents are free to substitute other goals for children and also substitute quality for quantity. Blake (1968) was quick to point out that such economic relations are true only for inferior goods and she showed why babies cannot be considered inferior goods. Duesenberry (1960) argued that when it comes to matters pertaining to children, parents do not have the freedom the economic theory assumes. Social norms constrain parental fertility behavior. According to Duesenberry (1960) "Economics is all about how people make choices. Sociology is all about why they don't have any choices to make".

Easterlin (1969) attempted to combine the economic perspective

with the sociological perspective. According to him what sociologists call norms are what economists call the taste factor. Economists assume taste factors to be equal and sociologists on the other hand, emphasize analysis of norms or the residual. According to this early economic framework, female employment is not a major variable but only a taste factor. If working females had lower fertility, it is because they prefer having fewer children.

At later stages, the economic framework of fertility placed greater emphasis on the household production model rather than the utility maximization demand model. Children were viewed as home produced consumer durables (Willis, 1973, Becker, 1968). The key input (factor of production) in a home production function is time. According to this framework, the major determinant of the level of fertility is the cost of parental time because "the largest single input into the child rearing process is parents time" (Turchi, 1975, p. 75). Therefore, as the price of parental time increases, so does the cost of child rearing and other home production. A rise in the price of time leads parents to engage more in market activities and less in non-market home production activities (Willis, 1973; Gronau, 1973; Ben-Porath, 1973; Schultz, 1973). This is supposed to explain not only the differential fertility between working and non-working wives but also the positive relationship between education and employment, and the negative relationship between education and fertility (Michael, 1973, Schultz, 1973).

Since Becker first hypothesized that the impact of income on

family size should be positive, economists have spent much of their time searching for that positive income effect. When the cost of time hypothesis became popular they have spent much of their time quantifying the actual cost of time (Willis, 1973; Gronau, 1973; Turchi, 1975). As a result, there exists hardly any empirical research on the association between fertility and female employment. Actually, economists paid little attention to the cost of time of non-working females (Willis, 1973; Ben-Porath, 1973). Instead, they assumed that the cost of time of non-working females is very low because they do not cash in their time in the labour market. As a result, they expected high fertility for non-working wives. For working wives, however, the cost of time was assumed to correlate with the level of the wife's education and therefore, economists expected a negative association between the level of education and fertility for working wives (Scultz, 1973; Willis, 1973; Ben-Porath, 1973). If this hypothesis is true, fertility differentials among working wives should disappear when controls are introduced for the level of education. This is yet to be subjected to empirical investigation.

Chapter Six of this thesis is devoted to an examination of the wife's employment-fertility relationship in a framework where both the sociological factors and the economic factors are taken into consideration.

CHAPTER 3

DATA AND METHODOLOGY

This chapter presents a discussion of the data being used and a description of the variables to be used in the analysis, an interpretation of their significance in relation to the wife's employment-fertility relationship and finally, a description of the methods employed in the analysis.

3.1 The Data

Almost all of the data used in this thesis are from the family file of the public use sample tapes of the 1971 census of Canada. Data from the long form census questionnaire were used to create the public use sample tapes and the sample size is one-in-one hundred families. For detailed description of the public use sample tapes see Introduction to the Public Use Sample Tapes, data dissemination, Statistics Canada, Ottawa, 1975.

The specific sample we have taken from the census tape consists of married women between the ages 45-64 who were living with their husbands. Husband present families were chosen because to have included women of other marital statuses would have confounded the problem considerably (Sweet, 1973). The age group 45-64 years was chosen to make sure that every one in the sample has completed fertility, and has not reached the age of retirement.

3.2 Major Variables

3.2.1 Number of Children Ever Born (BABIES)

This represents the respondents' total number of live births including children who died after birth as well as those residing elsewhere at census time. Adopted and step children are excluded.

3.2.2 Employment Status of Wife (CLSP)

In this variable, wives who mainly worked for someone else for wages, salaries, tips or commissions anytime between January 1, 1970 and the census date were classified as working wives. Wives who work without regular money wages for a relative who was a member of the same household were not considered as working wives.

It should be noted that this measure of labour force participation is drastically different from that used by the American Current Population Survey and the Canadian Labour Force Survey which refer to the employment status during the week immediately preceding the survey. Our intention was to capture as many persons who wanted to work as possible whether they were employed at the time of census or not.

This will appear as a binary variable in regression models, value 1 if wife had worked and 0 if wife had not worked.

3.2.3 Weeks Worked During 1970 (WWSP)

This variable was used to capture the intensity of labour force participation of wife. This refers to the number of weeks in 1970 during which the respondent worked, even for a few hours. It includes weeks of paid vacation or sick leave or paid absence on

training courses. This variable was constructed to correspond with the Employment Status of Wife (CLSP) variable in that if CLSP equals zero, WWSP will also be zero, and if CLSP equals one, WWSP will indicate the actual number of weeks worked.

3.3 Background Variables

3.3.1 Total Family Income minus Wife's Employment Income (INCOME)

Some kind of an income concept has often been considered in explaining fertility as well as married female labour force participation. It is well recognized that labour force behavior of married women is very sensitive to the financial situation in the family. The general expectation is that the wife is a secondary worker and seeks employment in order to supplement her husband's income. Repeatedly, the income variable has shown significant negative effects on wives' employment.

For a long periof of time, a negative relationship between income and fertility has been observed throughout the world. More recently, however, economists (Becker, 1961) as well as deomgraphers (Henripin, 1963; Rao, 1975; Beaujot, 1975; Madduri, 1979) have pointed out that fertility actually increases with rising income when other factors are adequately controlled.

In an examination of the relationship between wives' employment and fertility, the role of income becomes all the more important, because wife's employment becomes yet another source of family income. However, the choice of a measure of income that is relevant

for the determination of fertility becomes a difficult one when wife is working. To produce employment income, wife has to spend at least part of her time in the labour market, thus reducing the time available for production of "child services" (Willis, 1973) which are very intensive in her time. The implication of this is that wife's employment income does not produce an effect which may be called a pure income effect. Instead, the effect of wife's employment income will be very much contaminated by a negative substitution effect. Economists have speculated that the net effect of wife's employment income on fertility would be a negative one (due to the fact that substitution effects are greater than income effects) (Michael, 1973), but no empirical research has been done on the subject. To avoid this confusion, it will be the total family income minus wife's employment income that we use to represent income in our analysis.

Previous research has shown total family income minus wife's employment income to be one of the major predictors of wife's employment. This variable, however, has not been a popular candidate to capture income effects on fertility. Empirical evidence has been inconsistent as to the strength and the direction of the relationship between income and fertility. Human capital economists, however, demonstrate that when confounding effects are taken into consideration there is a positive association between income and fertility. The relationship is stronger when husband's income or total family income minus wife's employment income is employed to capture income

effects.

For the purpose at hand, our interest is to see if the relationship between wife's work status and fertility is contingent upon the values of this variable. In other words, we wish to test the hypothesis that fertility differentials due to work-status of wife depend on the levels of the income variable. Some background information in favour of this hypothesis is discussed below.

Students of the subject basically agree that there are two theoretically meaningful categories of working women, namely, those who work because of acute financial need in the family or because they have to, and those who work because they want to. As discussed in Chapter Two, those who belong to the former category, i.e. women who work because they have to, are known to have more children than those who belong to the latter category (Whelpton, Campbell, and Patterson, 1966; Ryder and Westoff, 1971). Note that the women who work out of financial necessity are the "poor" ones who would score relatively low values on the income variable described above. In other words, the empirical finding that the women who work out of financial necessity have more children would lead us to predict larger fertility differentials due to the work status of wife at the higher levels of the income variable and smaller fertility differential at the lower levels of the income variable.

Another dimension that may prodict the direction of the hypothesized relationship stems from the notion of selective mating. The greater the husbands income, the greater are the chances for his

wife to be better educated. The higher the education of the wife, the greater is the possibility for her to obtain a satisfying and gratifying job. Thus, she will have relatively lower fertility if she is actually working.

The points discussed above predict the direction of the hypothesized relationship to be negative. It should be noted, however, that the above is based on the theory that intrinsic rewards of employment are associated with restricted fertility and such rewards are available to working women in higher social classes. If the psychological dimensions of the interaction between social class and work status can be controlled, it will not be surprising to observe a change in the predicted direction of the relationship. This change would reflect the effects due to the intrinsic or the economic aspects of the interaction between work-status and social class.

One obvious dimension in this regard is the enhanced ability of the working mother coming from a rich family to find mother surrogates by way of better paid child care. For social reasons, she has better access to such facilities and for economic reasons she can make use of such facilities. If this argument has any value, fertility differential due to work-status of wife should be narrowed as the family's income minus employment income of wife increases.

The other economic aspect of the interaction between social class and wife's work-status is the monetary contribution to the family's wealth by the employment of wife. Income effects of wife's

employment income is greater. First, whatever money she brings home is an addition to the family income and should induce income effects. Second, as family income without wife's employment income increases, it is more likely that if wife is working her financial rewards are going to be relatively larger and, therefore, there will be larger income effects.

In summary, interaction between the social class and work-status of the wife has two theoretically meaningful dimensions--physological and financial--having completely opposite effects on fertility. Due to the psychological dimension, effects are negative and due to the financial dimension effects are positive. In economists' terminology they are called negative substitution effects and positive income effects, respectively.

3.3.2 Education of Wife (EDUSP)

A negative association across households between wife's education and completed fertility is one of the most widely and frequently observed relationships in the empirical literature on human fertility behavior (see Michael, 1973 for an excellent review of literature).

By way of explaining the observed negative association between fertility and education, it has been argued that more educated women have greater access to fertility control information and are, therefore, more successful in preventing unwanted pregnancies. There is considerable empirical evidence to support this reduction of excess fertility hypothesis from the surveys in the United States and elsewhere.

Growth of American Families (GAF) studies have clearly shown that more educated couples are more likely to have planned fertility as to both the spacing and the number of children and are less likely to have excess fertility or unwanted births. Educated couples use contraceptive techniques more extensively, approve of their use more thoroughly, and adopt contraception at an earlier birth interval (Freedman, Whelpton and Campbell, 1959; Whelpton, Campbell and Patterson, 1966; Ryder and Westoff, 1971).

Reported findings are similar for other countries as well. Broadly comparable findings for Lebanon (Yaukey, 1961), Barbados (Roberts et al., 1967), India (Dandeker, 1967), Ghana (Caldwell, 1967), Japan (Matsunaga, 1967), for example, offer supporting evidence for greater use and acceptance of contraception among the relatively better educated.

Economists, however, are not very excited about this reduction of excess fertility hypothesis. According to them, the wife's education increases the value of her time which is very extensive in the production of "child services" and, therefore, price of children should be very high for the better educated, and this will decrease the quantity demanded. This is perhaps "the key economic explanation for the observed negative relationship between the wife's education and the completed number of children" (Michael, 1973, p. 135).

Some recent researcher's have found a strange and puzzling pattern in the association between wife's education and fertility in

that at very high levels of wife's education, the association is not clearly negative. Ben-Porath (1973) working with cross sectional data from Israel reports that "the relation between fertility and education is steep at the very low levels of education and tends to flatten or even turn up at the top" (p. 204) and he calls this a "strange pattern". In his famous interaction model, Willis (1973) found a positive coefficient for the husband's income-wife's education interaction term and a negative coefficient for the wife's education variable. Thus, as husband's income increases the negative effects of education on fertility decreases with the possibility of an upturn at the high levels of income. In Canada, Bala Kirshnan et al. (1975) reported the following fertility (current number of children) deviations from the grand mean for the educational categories of wife: less than 9 years, +0.16; high school 1-3, +0.05; high school 4-5, -0.15; and college -0.07. This again shows an upturn of fertility at the highest level of education.

In his recent review of economists' contribution to human fertility research, Schultz (1973) declared that the fertility behaviour of well educated women a "puzzle" and called for more research in the area:

> In view of the importance of this relationship in determining public policy in support of elementary schooling, a special effort is called for, both in making sure of the empirical inferences (evidence) and resolving the apparent puzzle (1973, p. 9).

How does the education of the wife affect the employment-fertility relationship? How does the employment affect the education-

fertility relationship? Given the scope of the thesis, these are the questions we are primarily interested in.

Positive association between wife's education and employment is well known. In addition to this nearly universal observation, it has also been found that higher education is positively correlated with continuous participation in the labour force. Continuous participation in the labour force is a measure of work commitment which, according to some, is a necessary condition for restricted fertility (Sobol, 1973).

The idea that psychologically rewarding employment may lead women to curtail fertility but that employment per se may not, has been often expressed in the literature. The argument has been that in order for the wife to restrict fertility, the employment should "satisfy some of the same needs that having children does" (Hoffman, 1973, p. 7). Then only it becomes "truly an alternative to the familial female sex roles" (Havens and Gibbs, 1975, p. 269). It has also been shown that the highly educated women are more likely to obtain such gratifying employment.

> Education will not only have qualified her to hold a more interesting and responsible job, but it will, more often than not, have promoted the habit of seeking satisfaction in mentally stimulating work" (Klein, 1965, p. 138).

The same point has been observed by Sweet (1973):

> Education is positively correlated, for example, with access to pleasant, clean, non-manual occupations. Education level also should be positively correlated with the opportunity to find expression of various psychological needs for which women seek work (need for self expression, need for power, etc.)" (p. 13).

The hypothesis that stems from these observations is that education affects the employment-fertility relationship by producing drastically reduced fertility among the highly educated working women.

Human capital economists have advanced the same hypothesis but, of course, based on economic logic. According to Willis (1973), wife's education is a surrogate for her life time earning capacity the increases of which raises the opportunity costs of children. These opportunity costs, according to him are meaningful only if she is prepared to spend at least part of her time in the labour force. Therefore, education of wife should have a negative effect on fertility only if she works. Willis (1973) was unable to establish this rather strong hypothesis with the U.S. data that he analyzed. Ben-Porath (1973) working with Israeli data has shown that the education-fertility relationship is indeed different for working and non-working samples in that working women continue to reduce fertility as their education increases whereas non-working women tend to increase their fertility even at the very high levels of education. We will carry out a reexamination of these hypotheses later in the thesis (Chapter 4) and the variable employed will be the actual number of years of schooling attained by the respondents.

3.3.3 Age and Duration of Marriage (YEARSSP)

For obvious reasons, age and duration of marriage have always been the primary determinants of fertility. While they are necessary conditions for fertility, these variables lack substantive or

theoretical value in a fertility model. In this study these variables are used only as control variables. Note that by using these two variables simultaneously we will be able to control fertility variations due to age at marriage as well.

3.3.4 Religion and Ethnicity

It is rather conventional in differential fertility studies to examine the differences in fertility by religious denominations. Historically, for whatever reason, considerable fertility differentials by religious groups have been found. In this regard, the most crucial to Canadian fertility has been the Catholic and Non-Catholic fertility differential. A convergence of Catholic-non-Catholic fertility desires has been observed in the United States (Blake, 1967) but until recently, a trend of that sort has not been observed in Canada. A detailed study by Henripin (1972) clearly shows that for the twenty year period between 1941 and 1961, Catholic-non-Catholic fertility differentials have been remarkably constant. Toronto study of 1968 reports that actual as well as expected fertility of Catholics is still higher than that of Protestants (Bala Krishnan et al., p. 35). However, Burch (1966), and Krotki and Lapiere (1968) found some signs of convergence of Catholic-non-Catholic fertility. A preliminary analysis of 1971 census has shown almost a complete convergence of fertility between these two groups (Collishaw, 1976).

As regards to this convergence, the most dramatic observation in Canada has been the decline of fertility among the French speaking

population even below the levels of English speaking Protestants who have historically experienced very low fertility. Since over 90% of French speaking women in Canada are Catholic, it is almost impossible to discuss fertility differences among Catholics and Protestants without making reference to French speaking and English speaking populations. It will be of interest to study the ethnic factor in the decline of religious fertility differentials, and the religion factor in the decline of ethnic fertility differentials.

The measurement of ethnicity and religious affiliation causes problems in social research, especially when the research is concerned with the family behaviour as opposed to the individual behaviour. First, these are ascribed characteristics with no uniformity within groups. That is, there are degrees of ethnic affiliation and religiousness. But the nominal measurement of these variables does not reflect such variations. Second, the degree of influence by wife on matters pertaining to the family varies across households, and it becomes difficult to separate out the effects of the husband's religious and ethnic affiliation from the wife's ethnic and religious affiliation especially in the cases of inter-marriage (inter-religion or inter-ethnic). Research findings based on census data should be interpreted with these limitations in mind.

In this thesis we will examine the Catholic-non-Catholic as well as French speaking-English speaking fertility differentials but our focus of reference will be the confounding effects due to wife's labour force participation. Both the religion and ethnicity

will be considered dummy variables in the multivariate analyses. Religion will be measured as 1 if the wife is Catholic and 0 otherwise. Ethnicity will be assigned 0 to denote French speaking respondents and 1 to denote others.

3.3.5 Residence

One of the most consistent and significant fertility differentials in Canada has been that by place of residence (Charles, 1948; Henripin, 1972; Bala Krishnan et al., p. 51). Within rural areas, farm residence produces higher fertility than non-farm residence and as a whole urban fertility is much lower than rural fertility.

There are many reasons as to why such differences occur between urban and rural area. Bala Krishnan et al. provides perhaps the best summary of explanations:

> There is probably something inherently conducive to higher fertility in the rural economy, environment, social and familial relationships. That is, the economic utility of children is greater on the farm than in urban areas. Social networks are somewhat limited outside the home in rural areas and this may encourage larger and closer family networks. Marginal costs of additional children are likely to be smaller in the rural areas due to lower costs of land and housing. Concerns of social and geographic mobility may be less crucial in rural areas, and in this sense, children are not evaluated as costs in that rural people tend to be less mobile. Generally, the life style in rural areas is more home centered, which in turn is an encouragement to a larger family" (p. 51).

In regard to the relationship between female employment and fertility, the same authors observe that "rural occupations for women may also be more compatible to simultaneous child bearing and child rearing" (Bala Krishnan et al., p. 51). By implication, they expect

to see greater fertility differentials due to wives' employment in urban areas than in rural areas. Working with 1961 census data, Henripin (1972), in fact found such differentials in Canada:

> There is little difference in fertility, in rural environment, between women in the labour force and those who are not, and this is to be expected, since there is less conflict between family responsibilities and those which must usually be carried out within the context of a family enterprise (p. 341).

It will be of interest to see if this pattern exists in 1971 as well. Bala Krishnan et al. (1979) has already shown that the urban-rural fertility differential has drastically declined among the well educated. Given the fact that the propensity to work is greater among the well educated, what we see in 1971 could well be different from Henripin's observation in the 1961 data.

In this thesis both non-farm and farm categories will be grouped together to represent rural residence and will be assigned value 0 in multivariate analyses. All urban residents will be assigned value 1.

3.4 Methods of Analysis

Four different multivariate methods are employed in this thesis: multiple classification analysis, analysis of variance, discriminant analysis and multiple regression analysis.

Multiple classification analysis is a dummy variable regression technique which estimates a coefficient for each category of each independent variable (Andrews et al., 1973). The results are presented in the form of net deviations from the grand mean of the

dependent variable.

The main advantage of the multiple classification method over the dummy variable regression method is its ability to describe the "effects" or relationships in a way which is both unambiguous and easy to comprehend.

The multiple classification model assumes that the effects of the various independent variables on the dependent variable are additive. In any interaction effects are suspected, separate multiple classification analyses can be performed within categories of an independent or background variable. In Chapter 4, the fertility differentials by work status of wives are examined within each category of each background variable.

The discriminant analysis method isused to classify the sample into two hypothetical groups: working type and non-working type. A description of, and the rationale for this method is provided in Chapter 5. Several multiple regression models are specified and estimated in Chapter 6. The type of regression model employed depends on the type of problem being investigated. The rationale for the specification of the model can be understood within the context of the specific problem that is being analysed. Chapter 6 of the thesis deals with many logically related hypotheses and utilizes different regression models to test these hypotheses. A rationale for each model is provided in Chapter 6.

3.5 Limitations

The two important variables used in this thesis are the number of children ever born and work status of wife. The work status of wife variable indicates whether she is currently in the labour force or not. As such, we are discussing the general issue of the relationship between women's work and fertility on the basis of the results obtained by relating women's current employment status and their cumulative fertility. In doing so, "the varying nature of the relationship between women's work and fertility at different stages of the family life cycle may be masked" (Safilios-Rothschild, 1977: 364). The solution to this problem is, of course, to control for age and family life cycle (Fong, 1976). Unfortunately, the census data do not provide the relevant information on the stages of family cycle. When one has to work with the kind of data available from a census, there is hardly any solution to this problem. However, the past labour force behaviour has been found to be a significant determinant of the present labour force behaviour (Belloc, 1950; Bowen and Finegan, 1965; Fogarty, 1971). A recent study of Canadian data shows that "women who have recently been in the labour force are likely to have spent many of their reproductive years in the labour force as well" (Collishaw, 1976: 52). The generalizability of the results found in this thesis will depend on the degree of the accuracy of the above finding.

Another problem associated with the present analysis is related to the specific sample chosen. Women who were 45-64 years old

in 1971 experienced two distinct fertility patterns. The older cohorts were forced to curtail their fertility during the depression and the younger cohorts spent much of their reproductive years contributing to the baby boom. In other words, the fertility variations of the specific cohort chosen could well be due to the trend of the era rather than the socio-demographic reasons. However, we expect the age variable to account for this possible trend factor and all the results presented in this thesis are standardized for age of respondent. This limitation as well as the problems associated with the possible endogeneity of certain variables are discussed in Chapter 7.

CHAPTER 4

FERTILITY AND EMPLOYMENT STATUS OF WIVES: CONTRIBUTION OF BACKGROUND VARIABLES

4.1 Crude Fertility Differentials by Work Status

In the following paragraphs, we describe "crude" fertility differentials by employment status of wives. The term "crude" is used because they are presented with no controls introduced.

Chart 4-1 is a presentation of children born per 1,000 women ever married by wife's employment status. The relationship is very clear. Across all age groups, there exists a substantial difference in fertility, depending on whether the wife works or not. Chart 4-2 presents a further breakdown of wive's employment status showing differential fertility among the categories of employment. Wives in current labour force have the lowest fertility, while wives who never worked show the highest fertility. In Table 4-1, fertility differentials by intensity of labour force participation, as measured by the number of weeks worked since January, 1970, are shown. As expected, there is a clear negative relationship between fertility and intensity of labour force participation.

Table 4-2 presents the average number of children per wife by work status, for each category of each background variable. Although there does not seem to be any uniformity in the differences (in terms of absolute differences), the direction of differences is

rather clear. Working women, irrespective of their socio-demographic and economic group, have experienced lower fertility than their non-working sisters.

Having established the existence of crude fertility differentials by work status of married women, in the following paragraphs a preliminary attempt is made toward investigating the possibility of explaining the observed fertility differentials by work status of married women, with the help of the background variables. The null hypothesis is that the observed crude fertility differentials by work status are basically due to the selective association between work status of married women and background variables. Specifically, the statistical association between fertility and work status of married women is being subjected to a test of spuriousness.

4.2 Family Income Excluding Wife's Employment Income (income)

Fertility differentials by work status of wife are calculated and analyzed for five different categories of the income variable (Table 4-3). The average number of children born to wives in the families earning less than $5,000 is 2.85; and on the average, a working wife has 0.44 fewer children than a non-working wife. This highly significant difference is drastically reduced when the other background variables are introduced as controls. The adjusted deviations from the mean are not significant at the 0.05 level, meaning that there is at least a 5% chance of these deviations not to exist at all. In other words, the observed difference of 0.44

children between an average working woman and an average non-working woman in this particular income group could be explained by the variables religion, residence, ethnicity, and education. This pattern was repeatedly observed in all income groups, the exception being the fertility of wives belonging to families with incomes between $5,000 and $10,000. In this income group, the observed fertility differential of 0.54 children between working and non-working married women is reduced to 0.30 children after controls are introduced, but this adjusted difference remains statistically significant. It should be noted that this particular income group is represented by several unique characteristics. It has the lowest fertility (2.73 children per woman), the highest fertility differential by work status of wife, the highest percentage of working wives, and more members than in any other income group.

An examination of the beta weights reveals the following:

(a) Work status of wife is the least important variable in explaining fertility differentials within all income groups;

(b) As income increases, the effect of religion on fertility increases;

(c) The effect of education of wife on fertility becomes non-significant at the highest level of income;

(d) Ethnicity of wife has some significant effects on fertility determination at the lower levels of income, i.e. less than $10,000; but this fades away at the higher levels of

income; and

(e) Religion and residence remain significant in determining the level of fertility across all income groups.

4.3 Residence

Table 4-4 presents an analysis of fertility by urban and rural classification of residence. As expected, rural fertility is considerably higher than urban fertility. The fertility differential by work status of wife is lower in urban area than in rural areas.

When background variables are introduced as controls, the fertility differential by work status drops considerably both in urban and rural residences. Although reduced in magnitude, the fertility differential by work status remains statistically significant in urban as well as rural areas, even after controlling for background variables.

In both areas of residence, beta values for the work status variable are the lowest, suggesting less relevance of this variable in explaining fertility. All background variables considered have statistically significant effects on fertility in both rural and urban areas.

4.4 Ethnicity

The ethnicity variable is represented by the categories British, French and Others. As shown in Table 4-5, the category French shows the highest fertility of 3.44 per married woman. While

the number of children ever borne by a woman belonging to the residual category 'other' corresponds with that (the number of children ever born) by a woman of British ancestry, these two categories of ethnicity are substantially different with respect to their fertility differentials by work status. In this regard, the residual category of 'other' is quite similar to the French group, with fertility differentials by work status of 0.46 and 0.49 children respectively. Working women of British ancestry have only 0.27 less children than their non-working counterparts.

Again, the observed fertility differentials by work status for the three categories of ethnicity are substantially explained by the other independent variables. However, the effect of work status of women on their fertility remains statistically significant.

It is interesting to note that fertility of women of British ancestry is very much affected by their religious denomination, i.e. whether they belong to the Protestant faith or the Catholic faith. Among French, however, differences in religious deonomination make no difference at all with respect to fertility. This is probably due to the fact that there is hardly any variation in the religion variable among the French. Over 90% of French-Canadians are Catholics, and therefore, it is not surprising that the Catholic-non-Catholic dichotomy does not serve to explain French-Canadian fertility.

4.5 Religion

The fertility differential by work status of wife is 0.53

children for Catholics and 0.27 for non-Catholics. In other words, working Catholic women tend to deviate more from the fertility norm than working non-Catholic women. However, the work status of women, be they Catholic or non-Catholic, is not a major predictor of their fertility (see Beta values in Table 4-6).

4.6 Education

Education of wife is represented by six categories. They are, grade 9 or less, grade 10, grade 11, grade 12, some university, and university degree. Fertility across these categories varies from a low of 2.12 children for the highest level of education, to a high of 3.24 for the lowest level of education (Table 4-7). Within each education group up to and including grade 12, there is a significant fertility differential by work status of women, but beyond grade 12 this fertility differential fades away. It is interesting to note that at the higher levels of education even the direction of the relationship between fertility and work status changes, in that working women have more children than their non-working sisters. This puzzling finding will be dealt with in detail later in the thesis.

At the lowest level of education, there is a fertility difference of 0.49 children between working women and non-working women; and about half of this differential could be explained by the other independent variables. This pattern holds true for all pre-university categories of education. At the pre-university

levels, the effect of work status of wife on fertility is statistically significant, but at the higher levels of education work status is not a significant determinant of the fertility level.

4.7 Summary

The general procedure used in this chapter was to first establish the fertility differentials by work status of wife, then to control these differentials for the background variables. This procedure was repeated for each category of each background variable. This exercise revealed the following:

(a) Generally speaking, non-working women had more children than working women.

(b) The fertility differentials by work status showed considerable variation across various socio-economic groups.

(c) The negative fertility-work status relationship was more pronounced among the Catholics than the non-Catholics, among the rural residents than the urban residents.

(d) The crude fertility differentials by work status faded away when the background variables were introduced as controls. This was clearly shown within the sub samples of the highly educated, the poor and the very rich.

CHAPTER 5

FERTILITY AND WIVES' EMPLOYMENT: A TEST FOR SPURIOUSNESS OF ASSOCIATION

5.1 Introduction

According to Blake (1965), the negative association between employment of married women and family size has been "generally acknowledged to be one of the strongest, most persistent over time and space and most theoretically reasonable in the field of the social determinants of fertility". After an exhaustive review of the literature on the subject, Hawthorn (1970) was unable to make as strong a statement as Blake made. Instead he concluded that "all that can safely be said is that there does not seem to be a recorded instance in which there is a positive relationship between working women and fertility" (p. 105). However, there are many recorded instances where researchers could not find a significant relationship between these two variables (Federeci, 1968) in the agricultural south of Italy; Mazur (1968) in some urban areas of Russia; Gendell (1965) and Stycos and Weller (1967) in reference to the areas where extended family ties are strong; Weller (1971) in reference to blue collar workers. There is a whole body of literature where current work, work experience, and expectations regarding work were shown to be associated with various measures of past, present and expected fertility, and with contraceptive practices

(see Sweet (1973) for an excellent review of literature). What is common among all these studies is a concluding statement such as:

> it is difficult to decide whether the high incidence of childlessness is due to a tendency for wives to work if they cannot bear children or to the deliberate avoidance of having children by wives who prefer to work. Nor, likewise, is it possible to decide whether families are smaller because wives desire to be employed or whether they are employed because their families are smaller (Ridley, 1959: 281).

In spite of this vagueness as to the causality of the association between mothers' employment and fertility, some social scientists have been eager to use this observed association for social engineering purposes. It has been suggested that fertility can be drastically reduced by developing policy to encourage females to participate in the labour force continuously (Kupinsky, 1971, 1977). Some necessary elements of such a policy have been enumerated by Krotki (1969). He considers low male wages and high female education as tools of social engineering for the population problem. The argument is that both low male wages and higher female education lead to a higher level of female labour force participation, which in turn causes a low level of fertility. It is as a reaction to this kind of strong conclusions that the discussion of spuriousness in the fertility-employment relationship emerged.

In their study of historical changes in fertility and employment of mothers, Myrdal and Klein (1956) speculated that the correlation between work and fertility could indeed by spurious because "personality traits can act selectively in favour of both planned

families and the gainful employment of women" (p. 119). The general argument in regard to the spuriousness of the employment-fertility relationship is rather simple. Female participation in the labour force and a smaller family size may each be produced as the result of a "common set of pre-conditioning socialization patterns by some psychological predisposition" (Weller, 1974: 3). Hawthorn (1973) believes that female labour force participation is an indicator of, or produced by, social and economic modernization dimensions, which are "conditions for reducing fertility anyway" (p. 105). Research of the female labour force has repeatedly indicated that higher participation rates are determined by lower income of husbands, higher education, urban residence, and other such factors. These conditions are the well recognized determinants of lower fertility. So the argument that, given these conditions, independent of the wife's employment, her fertility should remain low, is intuitively plausible.

The description provided in the previous chapter could be regarded as a preliminary attempt to test this spuriousness hypothesis. At every level of all background variables, fertility differential by work status of wife was calculated with and without controls. Observed fertility differentials by work status of wife were considerably reduced when background variables were introduced as controls, provided some indication as to the possibility of spuriousness of the relationship. In this chapter, the results of two statistical tests of the employment-fertility relationship are reported.

5.2 Multiple Regression Analysis

Traditionally, statistical investigation of a spurious association is carried out by estimating partial correlations or partial regression coefficients. In regard to the present problem, it is hypothesized that married female labour force participation (CLSP) and fertility reduction both result from the same forces. The same set of variables affect both phenomena in opposite directions, thus producing a strong negative correlation which may be spurious. The statistical model takes the following additive form (the expectations on the basis of the spuriousness hypothesis are shown in parentheses):

$$Y_2 = \alpha_1 Y_1 \qquad (\alpha_1 < 0)$$

$$Y_2 = \sum_1 \beta_i X_i + \alpha_2 Y_1 \qquad (\alpha_1 = 0)$$

where Y_2 = Number of children

Y_1 = Employment status of wife

X_i = Background variables

α_i = Regression coefficients for Y_1

β_i = Regression coefficients for X_i

Estimated values of the coefficients are presented in Table 5-1. Both measures of wife's employment produce significant negative regression coefficients. When the background variables are introduced, the magnitude of the coefficients is greatly reduced; but they remain significantly different from zero. Therefore, at least at this level of analysis, we are unable to establish the hypothesis that the employment-fertility relationship is spurious.

It is interesting to note that all the variables except

ethnicity produce significant coefficients, and the signs of coefficients are as expected. When religion is dropped from the equation, ethnicity produces a highly significant coefficient of -.347 (t = 7.1), but R^2 drops to .17. However, when ethnicity is dropped, both the coefficient for religion and the R^2 value remain unchanged. Also, the standard error for the ethnicity coefficient remains almost the same whether religion is in the equation or not (.051 when the religion included and .049 when religion excluded). In all probability, it is not the problem of multicollinearity that is driving ethnicity out of significance, but the fact that ethnicity has lost its direct effect on fertility determination.

It should be noted that the results of the test reported above do not lead us to any strong conclusions. First, there is no guarantee that the additive model is the right representation of the fertility function. Second, there is always the possibility that the background variables identified by us do not exhaust the full domain. For example, we have not controlled for any of the personality traits that Myrdal and Klein (1956) referred to. Third, whether the background variables in the estimated model represent the indicators of what Weller (1974) called "preconditioning socialization patterns" or what Hawthorn (1973) called "social and economic modernization dimensions" is not known. Theoretical speculations offered by Myrdal and Klein, Weller, or Hawthorn may never be subjected to adequate empirical testing, because these speculations have not been elaborated adequately.

Germane to the idea of the spuriousness of the fertility-employment relationship is the assumption that there exists a population category that may be called the "working type". The hypothesis emerging from this assumption is that among "working types"; there are no fertility differentials by actual work status of wife. Specifically, the following two hypotheses are proposed for empirical investigation: (a) The working type group has much lower fertility than the non-working type group; (b) There are no fertility differentials due to the actual work status within the working type and the non-working type groups. In other words, the membership of these hypothetical groups is hypothesized to be the key factor in determining fertility behavior, rather than the actual employment status.

The basis for the above hypothesis is the assumption that there exists two typical populations: the working type and the non-working type. This assumption, however, cannot be subjected to a rigorous statistical investigation because these "types" represent only a conceptual construct with no distinct empirical components. We have accepted the assumption as true and attempted an empirical construction of the concept.

Empirical construction of a "working type" is a difficult task. Previous literature in Canada (Ostry, 1970) and elsewhere (Sweet, 1973) points to the ideal socio-economic characteristics of a working woman. However, it is not easy to specify these characteristics in any deterministic manner in an attempt to identify a

working type person. Highly educated wives have a greater probability of being in the labour market; but it may be erroneous to classify a highly educated wife as a "working type". A highly educated, urban wife whose husband's income is low may qualify to be a working type, but still only in a probabilistic sense. If such probabilities can be calculated for each individual based on the background information (i.e. "predictors" of working or not working), it may be possible to classify a population into two groups--working type and non-working type--by specifying a cut-off point in the probability continuum. The following paragraphs present the results of an attempt to construct a working type, and to test this somewhat richer hypothesis that among working types there are no fertility differentials by actual work status.

5.3 Discriminant Analysis

One of the main objectives of discriminant analysis is to clasify a population into two or more groups which are statistically distinguishable. To distinguish between the groups, a discriminant function is derived by forming linear combinations of a set of discriminating variables that measure characteristics on which the groups are expected to differ. The procedure for classification involves the use of a separate linear combination of the discriminating variables for each group. These produce a probability of membership in the respective group, and the case is assigned to the group with the highest probability.

The method outlined above seems to be the most appropriate for the empirical construction of a "working type". On the basis of the known characteristics of the individuals it is possible to classify the sample into two groups--likely to be working (working type) and not likely to be working (non-working type)--by performing discriminant analysis on the sample. Then, these two groups could be analysed for fertility differentials. The expectation is that there are no fertility differentials due to actual work status of wife within groups; but the working type group will have considerable lower fertility than the non-working type group.

It should be noted that a measure of fertility has always been considered to be a prime determinant (a discriminating variable in the present context) of married female employment. This, however, becomes probematic in the present analysis. Since ours is a study of fertility differentials, it would be circular to use a measure of fertility as a group selection criterion. Therefore, fertility will not enter into the discriminant function we have formed. The discriminating variables we have chosen are: income, education, residence, religion and age.

Tables 5-2 and 5-3 present the results of discriminant analysis. The discriminating power of all the individual variables and the function is statistically significant. However, one must be cautious not to attribute too much discriminating power to the estimated function. Wilk's lambda remains rather high, canonical correlation and eigenvalue (equilvanet to R^2 in regression) remain low to warrant

greater strength to the function. As shown in Table 5-3, only 62% of the cases are correctly classified.

It is to be noted that the above caution should not be over-emphasized either. The primary purpose of the exercise is to classify the sample into two groups, one consisting of those who are likely to be working, the other those who are not likely to be working. Achieving successful discrimination between the actually working and the actually not-working is not only unnecessary, but also undesirable from the point of view of the intended analysis, because a greater success in prediction of actually working or not working will not allow a reliable within group analysis.

5.4 Actually Working Vs Working Type

How does the fertility of working type women compare with that of actually working women? As shown in Table 5-4, the average number of children born per actually working woman is almost identical to the average number of children per working type woman (2.54 and 2.52 respectively). This finding is especially interesting because of the fact that the average fertility calculated per working type woman represents the fertility behavior of 3,518 respondents, while there were only 2,488 respondents in the category of actually working. If no other information is available, one would conclude that a significant segment of the population who do not work conform to the same fertility norms as those who do work. However, working women do not represent a true subset of working type women. More

than one third of the women who actually worked (887 out of 2,488) belonged to the non-working category, while over one half of the working type women (1,917 out of 3,518) did not participate in the labour force. These cross-classifications are presented in Table 5-4. This additional information would make the conclusion even stronger. As presented in Table 5-4, working type women, who actually did not work, experienced much lower fertility than those who actually worked but failed to belong to the working type classification (2.64 children a.d 2.82 children respectively (F = 57.32 with 1 and 2.804 degrees of freedom, p. = .000).

5.5 Actually Not Working Vs Non-Working Type

Those who had a lower propensity to work did experience higher fertility, irrespective of their actual employment status (Table 5-4). As a group, their fertility was even higher than the fertility of those who were actually not working (3.17 children and 3.02 children respectively)*.

Table 5-3 shows that the discriminant analysis classifies 3.518 in the working group while there were only 2,488 actually working. According to the specified function, only 64.3% of those who were actually working should have been working. The predicted working group results in the selection of 1,917 members from the

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* Note that we are unable to make a statistical investigation of this difference because they are not mutually exclusive categories.

group of actually not working women.

Table 5-4 presents a comparison of fertility differentials within and between the actual and the predicted groups. Between the actually working and the actually not working groups there was a fertility differential of 0.48 children. The fertility differential between working type and not working type was 0.65 children, an increase of 35% from the actual work-non-work classification. On average, the working type women had fewer children than the actually working women (2.52 children and 2.54 children respectively), and the non-working type women had more children than actually not working women (3.17 children and 3.02 children respectively). This result is rather encouraging, given the fact that we were successful in correctly classifying only 62% of the cases. It seems that although the discriminant function was less than perfect in predicting the actual work status, it has performed rather well in classifying the two groups according to their distinct fertility experience.

5.6 Within Groups Fertility

The average number of children for the actual and predicted categories of work is presented in Table 5-4. The lowest fertility is found when working type women were actually working (2.32 children). Not working women belongong to the non-working type produced the highest fertility.

Working type women did differ in their fertility behavior depending on their actual employment status. So did the non-working

type women. The fertility differentials due to actual work status within the working type group was 0.32, and within the non-working type group it was 0.46. When controlled for the age and duration of marriage, these differentials drop slightly, but remain highly significant (Table 5-5). Thus, we are unable to make a strong statement that there are no fertility differentials due to actual work status within the predicted group of working women.

The fertility differentials by the working type-not working type classification within the actual work status categories are presented in Table 5-7. Within the working wives group, there was a crude fertility differential of 0.44 children due to the predicted work classification, and this differential was further increased to 0.59 when the controls were introduced. Within the non-working type group, the adjusted fertility differential increased to 0.89 children. These differentials were considerably greater than the differentials observed within the predicted groups. The aim of any classification system is to maximize between group variations and minimize within group variations. Working and not working groups of females have traditionally shown these characteristics with respect to their fertility behavior. The importance of the present analysis is that it has producted a classification which is even stronger than the work status of women. The "type" classification has produced greater between group variation and smaller within group variation, in comparison with the actual work status classification.

5.7 Relative Importance of the Concept of Working and Non-Working Types in Fertility Analysis

In the following paragraphs, we present a further analysis of the same data. Table 5-7 presents the results of a multiple classification analysis of the number of children with actual work status and predicted work status as independent variables. Age and duration of marriage are introduced as covariates. The purpose of this analysis is to evaluate the relative importance of the "type" concept, as opposed to the actual employment status of women, in differential fertility research. The discussion at the beginning of the chapter signalled to the hypothesis that the working type classification is much stronger in explaining fertility differentials than the actual employment status classification.

As discussed earlier and shown in Table 5-8, there was a fertility differential of 0.48 children between the actually working and the actually not working categories. Between the working type and the not working type, this differential was 0.65 children. When adjusted for covariates and each independent variable, the fertility differential due to actual work status declined by about 50% to 0.33 children, while the fertility differential due to predicted work status increased to 0.80 children. An examination of the analysis of variance table (Table 5-9) shows that the amount of variation explained by working type classification (sum of squares = 884.704) is more than five times the amount explained by actual employment status classification (sum of squares = 167.563). It is interesting to note

that the interaction term of these two classifications was statistically significant, suggesting that there is a joint effect of these two variables as well. Although this interaction term nullifies the assumption of additivity in the multiple classification analysis, this should not be considered a serious problem. The sum of squares (amount of explained variation) due to the interaction term was rather low (14.346), in comparison with that due to main effects. The conclusion should be that the concept of working--non-working types is much stronger than the actual employment status in producing differential fertility; and therefore, it has more merit as an explanatory tool than the actual work status in fertility research.

5.8 Summary

The major purpose of this chapter has been to test the hypothesis that employment of wife-fertility relationship is spurious. The issue was examined in two different ways. First, it was assumed that both lower fertility and higher levels of married labour force participation are produced by the same set of variables, and therefore, there should not be any direct relationship between wife's employment and fertility. This was tested in a multiple regression framework and the hypothesis was not substantiated by the results.

Second, it was hypothesized that there exists a group of females that may be called "working type". Working type females may actually work or stay at home. In the determination of fertility,

the membership of the group, rather than the actual work status, was assumed to be the key factor. It was hypothesized that between working types and non-working types there are great fertility differentials, but within groups there are no fertility differentials by the actual employment status of wives.

The following is a summary of findings:

1. The empirically constructed working type and non-working type classification produced greater fertility differentials than the actual employment-non-employment classification.
2. Within the "type" classification groups, actual employment status produced significant fertility differentials. Thus, we were unable to establish the strong hypothesis that there are no differences in fertility within the "type" groups.
3. There was considerable variation in fertility within the group of actually working women, and their membership in the working type group or the non-working type group was able to explain a significant amount of this variation. The same was true for the group of actually not working women.
4. When the working-non-working type classification and actual work status were simultaneously considered, the working-non-working type classification emerged as a far superior predictor of fertility than the actual employment status.

CHAPTER 6

EMPLOYMENT OF WIFE AND FERTILITY: SOME INTERACTION MODELS

6.1 Introduction

This chapter presents the results of the multivariate analysis of the fertility of married women. The primary concern is to describe the effects of interactions between employment and some socio-economic variables on fertility. Answers are sought to questions such as: what, in fact, is the nature of the employment-fertility relationship? Are there any meaningful interactions between wives' employment and other independent variables? Why does the association between wives' employment and fertility vary among sub-samples?

6.2 Interacting Association

Whereas exogenous models, with or without intervening variables, predict covariations, interaction models predict that different levels (as opposed to variation) of one variable produce different degrees of association between two other variables. In the context of differential fertility with respect to employment of wife, an interaction model may predict that the association between these two variables is contingent upon whether the respondent is rich or poor, educated or uneduated, Catholic or non-Catholic or living in an urban centre or a rural area.

One obvious conclusion that can be derived from the previous

literature on the relationship between employment of wife and fertility is that the degree of this relationship varies in different socio-economic contexts. It may be noted that some relevant literature review was done in Chapters 2, 3, and 5.

A classic example of an interaction effect is the empirical finding that controlling for other variables, American working black wives do not reduce their fertility with the same magnitude as the working white wives do (see, Oppenheimer, 1970, Sweet, 1973). As cited in Chapter 3, an interaction between education and employment has been reported by Ben-Porath (1973), in that non-working wives in Israel increase their fertility at the top levels of education, while working women continue to reduce their fertility with the educational achievements.

The 1961 census monograph by Henripin (1968) points out such interactions in Canada as well:

> The sub-fertility of active women, . . ., seems to prevail amongst all segments of the population, but the degree of its intensity depends upon whether the spouses are well educated or undereducated, on whether their income is high or not and on whether the wife is Anglo-Protestant or French Catholic (p. 302).

He also observes that:

> The sub-fertility of active women is higher in urban areas than in the rural non-farm environment and higher in the latter case than for rural women living on farms (p. 293).

The analysis reported in Chapter 4 indicated that at various levels of independent variables, the degree of relationship between fertility and employment do not remain constant. In other words, the

employment-fertility relation is contingent upon the levels (as opposed to variation) of certain other independent variables that the family represents. In Chapter 5, one regression equation was specified where the employment status of wife entered the equation as a dichotomy and the other variables were considered linearly related to the dependent variable-number of children ever born. Such a specification assumes that no matter at what point of the socio-economic matrix a woman is located, if she works, she will have X number of children less than if she is not working, where X number of children represents the estimated regression coefficient for the dichotomous employment status of women. This strict determinism cannot be supported by theory or by empirical evidence. When a dichotomous independent variable enters the regression equation as a theoretically substantive variable, and the sample size is small it is appropriate to test for the equality of the regression coefficients under both conditions of the dichotomy. The appropriate test statistic to examine this phenomenon is the following F ratio:

$$F = \frac{(ESS_3 - ESS_1 - ESS_2) / K}{(ESS_1 + ESS_2) / (n_1 + n_2 - 2K)}$$

With k and $n_1 + n_2 - 2K$ degrees of freedom (Johnston, 1963, pp. 136-138).

where k = number of independent variables + 1

n_1 = number of observations when D = 0

n_2 = number of observations when D = 1

and ESS = error sum of squares.

Estimated equations are presented in Table 6-1. The application of this test to the sample yields a F ratio of 7.42, providing confidence to accept the alternative hypothesis that the regression coefficient does not remain constant under both conditions of the dichotomy. Thus, our results indicate that the treatment of work status of wife as a dichotomy in fertility equations may be a misspecification of the true relationship. Fertility responses of background variables are not the same between working and non-working wives. In other words, employment status of wife tends to interact with at least one of the variables in producing differential fertility.

When the existence of interaction effects is diagnosed, the appropriate statistical treatment is to test the saturated model in which all possible interaction terms appear in the equation. This, however, is neither necessary nor feasible in our thesis. First, our concern is the fertility differentials as produced by work status of wife. Second, a saturated model is bound to produce severe multicollinearity so that the estimation of the model becomes impossible. Third, interaction terms of third or higher order are not easily interpretable. These limitations lead us to introduce six interaction terms, one for each background variable, into the model. However, as mentioned in Chapter 3, age of wife and marriage duration are considered only as control variables. Thus, the number of interaction terms can be reduced to four. The resulting model takes the following form:

$$Y = \Sigma\beta_i X_i + \alpha Y_1 + \Sigma\xi_i X_i Y_1 + \S_1 Z_1 + \S_{2i} Z_2$$

where Y = measure of fertility

Y = employment status of wife as a dichotomy (CLSP)

Z = age of wife

Z = marriage duration

X = other independent variables (i.e. income, education, religion, residence)

$\beta_i, \alpha, \xi, \S_i$ = regression coefficients to be estimated.

The rate of change of fertility due to employment is:

$$\frac{\partial Y}{\partial Y_1} = \alpha + \Sigma\xi_i X_i$$

This indicates that the total effect of employment status of wife depends on the levels of X_i. The coefficient α can be considered as the direct effect of employment status on fertility. Another implication of the model is that, depending on the work status of wife, the effects of other independent variables vary as well. These effects are derived as follows:

$$\frac{\partial Y}{\partial X_i} = \beta_i + \Sigma\xi_i Y_1$$

The estimated version of the model is reported in Table 6-2. The income-employment interaction term does not produce a statistically significant coefficient. The other interaction terms are significant at least at the .01 level.

6.3 Fertility Effects of Employment Status

Since INCOME-CLSP interaction is not significant, the fertility

employment relationship can be shown as follows:

$$\frac{\partial \text{ Fertility}}{\partial \text{ CLSP}} = -.58250 + .03505 \text{ Education} - .22091 \text{ Religion} + .25831 \text{ Residence}$$

(Source: Table 6-2, regression 1)

The first coefficient represents the direct effect due to employment status. It is negative and strongly significant. The employment fertility relationship is also dependent upon respondents' education, religion and residence. The higher the education of the working wife, the lower the fertility differential due to her work status. Catholic working women suppress fertility at a greater rate than non-Catholic working women. Urban working women are less responsive to fertility reduction than rural working wives.[2] Table 6-3 presents the total effects of employment status on the number of children ever born for all combinations of residence and religion categories. The effects are calculated at the mean value of the education variable. Other things being equal, Catholic working wives from the rural areas have .48 children less than their non-working sisters. Urban non-Catholics experience the smallest fertility differential due to work status of wives.

When the dichotomous employment status variable is replaced by the number of weeks worked (regression 2, Table 6-2), the total predictive power of the equation is slightly enhanced and the directions of relationship remain unchanged. Conceptually, number of weeks worked (WWSP) should be capturing the effects due to intensity of labour force participation, as opposed to working per se. However,

this variable has the property that when CLSP equals zero, WWSP is also zero, and when CLSP equals one, WWSP assumes the value indicating the actual number of weeks worked. Therefore, the number of weeks worked can be assumed to act as an interaction term between WWSP and CLSP. On the basis of this assumption, Table 6-4 and 6-5 are prepared. According to Table 6-4, the only group of working wives whose fertility is lower than their non-working sisters is the rural-Catholics. All the other working groups show a positive response to fertility. It should be noted that the variable CLSP does not appear in the equation estimated. Perhaps we are omitting possible direct effects due to work status in these calculations. Although CLSP and WWSP represent two different dimensions of work, inclusion of both variables in the same equation does not produce satisfactory results. As shown in Table 6-2, regression 3, WWSP drives CLSP out of significance.[3]

6.4 Interaction of Religion and Residence With Employment Status

Broadly speaking, our findings indicate that Catholic or rural working wives show greater reductions in fertility in comparison with non-Catholic or urban working wives. This does not mean that the fertility of rural working wives or Catholic working wives is lower than that of urban working wives or non-Catholic working wives. Reference should always be made to differential fertility between working wives and not working wives. For example, the difference in fertility between working and not working groups are larger in rural

areas than in urban areas and larger among Catholics than among non-Catholics.

These findings seem to indicate the emergence of a unique pattern of fertility behaviour among Canadian working wives. Accoring to Henripin (1968), the fertility pattern of Canadian working wives was quite different in 1961. He found fertility differentials due to employment status of wife to be greater in urban centres than in rural areas and greater among non-Catholics than among Catholics. Why this pattern changed in 1971 is not known. However, one may suggest some reasons as to why the observed relationship is possible.

First, the fertility of urban women and non-Catholic women is fairly low to begin with, and further fertility restrictions in order to facilitate employment may not be necessary. The opposite may be true in rural areas and among Catholics. Second, the knowledge of contraception is rather widespread in urban areas. In rural areas, there may be a large difference in contraceptive knowledge between working wives and non-working wives. The situation could be similar among Catholics and non-Catholics as well. Working outside the home for monetary rewards is a relatively rare occurance in rural areas and among Catholics. Those who participate in such work may be considering themselves to be emancipated and accepting the "modern" fertility norms more readily.

Third, urban areas have more and better day care facilities, but in many rural areas such facilities are not available. As a

result, those rural residents who want to work have to curtail fertility, whereas in urban centres, paid mother surogates are relatively easy to find. Fourth, a good proportion of working women in rural areas may have either moved from urban centres or have been educated in urban environments. If this is true, they can be expected to have more urban values which are conducive to lower fertility.

6.5 Interaction of Education with Employment Status

Estimated contingency models show that the fertility-employment relationship is stronger among the less educated, and as the level of education increases, the fertility differential due to employment status becomes smaller. As clearly shown in Chapter 4, at the education category of some university working and non working wives show virtually no difference in their fertility behavior; and at the university degree level, working wives have more children than their non-working sisters.

The other dimension of this interaction has to do with the effects of education on fertility. The prediction of the model and the empirical finding is that the negative effect of education on fertility is lower for working wives in comparison with non-working wives. According to regression 1 in Table 6-2, for not working wives the coefficient for education is -.07543, and for working wives it is -.04038 (i.e. -.07543 + .03505). When separate regressions are run for working wives and non-working wives, we obtain the same

results (see Table 6-1).

Before we examine why this difference should occur, we must try to rule out alternative explanations. One that comes to our mind is the possibility of a non-linear education-fertility relationship in the total population and over representation of working wives at the higher levels of education. An extreme case of this possibility is depicted in Chart 6-2. If this is true, we will obtain two distinct slopes for working wives and non-working wives, when in fact, work status of wife has nothing to do with the education-fertility relationship. To resolve this, three regression equations are estimated, one replacing the CLSP-EDUSP interaction term with the squared term of the education variable, one with the interaction as well as the squared term of the education variable and the other with the squared interaction term. Results are presented in Table 6-5.

The squared term of the education variable does produce a positive coefficient, but it is not quite significant statistically. When the interaction term is introduced, the squared term of education loses its significance completely and the interaction term remains statistically significant. The squared interaction term produced a stronger coefficient, as shown by its higher t value; and it adds slightly more to the predictive power of the equation. This test indicates that the effect of education on fertility does depend on the employment status of wife. Non-working wives show a reduced number of children as the level of education increases; and working

wives experience a non-linear education-fertility profile, with the possibility of an upturn of fertility at the top levels of education. Stated formally (from regression 3 of Table 6-5):

$$\frac{\partial \text{ Fertility}}{\partial \text{ EDUSP}} = -.07587\text{--for not working wives}$$

$$= -.07587 + 2(.00185)\text{EDUSP--for working wives.}$$

For the group of working wives, the effect of education on fertility becomes positive only after 20 years of education. Therefore, for all practical purposes, what we have is a non-linear fertility-education profile, in that the effects of education on fertility flattens at the high levels of education.

This finding clearly is at odds with the accumulated knowledge of the fertility-education relationship to date. If the fertility-education relationship was found to be non-linear in the total sample, one would have been in a comfortable position in showing a parallel between our results and the results obtained by many others (Levine, 1968; Farley, 1970; Westoff et al., 1975; Kiser et al., 1968; Freedman et al., 1966; Hawthorn, 1970; Bala Krishnan et al., 1975). Would the education-fertility relationship be different between working and non-working wives? To the best of our knowledge, only the economic theory of fertility makes a prediction in this regard. Proponents of this theory (Becker, 1960; Willis, 1973; Ben-Porath, 1973), however, predict that the education-fertility relationship is strongly negative among working wives and that there is no such association among not working wives.

Michael (1973) describes the position of economists:

> In the current literature on human fertility, it is generally assumed that children or child related consumption is relatively intensive in the wife's time. Thus, increases in her time value (as measured by her level of education) raise the price of her children and lower the quantity demanded. This is perhaps the key economic explanation for the observed negative relationship between the (working) wife's education level, and the completed number of children (p. S135).

In economists' terms, higher cost of time produces negative substitution effects away from children. In other words, the higher the level of education, the higher will be her market wage rate; and the higher the market wage rate, the greater will be the time spent by her in the labour market.

In spite of the theory, economists have observed non-linearities in the education-fertility profile:

> A strange pattern emerges however, in that the relation between fertility and education is steep at the very low levels of education and tends to flatten or even turn up at the top (Ben-Porath, 1973, p. 204).

In his review of economists' contributions to the study of human fertility, Schultz (1973) has declared this a puzzle and has called for more research to resolve it:

> I am impressed by the evidence that the relationship between additional schooling of mothers and the number of children is strongly negative for the early years of schooling of mothers. But, why this relationship should not continue for additional education at the higher levels is a puzzle (p. 9).
>
> In view of the importance of this relationship in determining public policy in support of elementary schooling, a special effort is called for both in making sure of the empirical inferences (evidence) and in resolving the apparent puzzle (p. 9).

It should be noted that economists were surprised to see non-linearities in the total sample. What we have observed is the extreme case, in that the working wives sample produces a non-linear education-fertility profile, while the non-working wives sample produces a strong negative profile.

It is our view that the resolution for the observed "puzzling" relationship lies in the economic theory itself. The argument advanced here is based on two simple facts accepted in the general economic theory and in the economic theory of fertility. First, any increase in income produces income effects and income effects are never negative. Second, the wife's employment must produce some income effects because she brings income to the family. The reason for the observed negative correlation between employment of wife and fertility is the greater strength of the negative substitution effects, in comparison with the positive income effects. However, under special circumstances, if wife's employment produces more income effects than substitution effects, this should be reflected in her fertility behavior by way of showing a positive fertility differential due to work status.

With reference to the education-fertility relationship of working wives, we readily accept the economist's point of view that education reflects cost of time and therefore it must produce negative substitution effects away from children. At the same time, we would argue that education level determines the employment income of wife, and the higher the level of education of a working wife,

the higher should be her employment income; hence greater income effects. Highly educated women tend to marry highly educated/and or income group men, thus exerting even more income effects. Negative effects of education on fertility become smaller as the level of education increases, because the positive income effects are catching up with the negative substitution effects. If the education-fertility profile turns positive at the top level of education, it indicates the strength of positive income effects to over-compensate for the negative substitution effects. Note that non-working women do not enjoy any income effects, because they do not make income. Therefore, their education-fertility profile should remain negative at all levels of education.

This argument remains conjectural if it is not subjected to empirical testing. In order to test the hypothesis, one must include the employment income of wife (EMPSP) in the equation. An attempt to test the hypothesis is discussed below.

In view of the above discussion, it is hypothesized that the effects of education are two-fold. First, it produced negative substitution effects for economic and social reasons. Second, it produces positive income effects if the wife is working because the working wife brings in income. The net effect of education depends on the amount of income she produces, other things being equal. This hypothesis can be formally presented as follows:

$$\frac{\partial \text{ Fertility}}{\partial \text{ Education}} = \beta_1 + \beta_2 \text{ EMPSP} \quad (\beta_1 < 0;\ \beta_2 > 0) \qquad \text{----------(1)}$$

The relationship between wife's employment income and fertility is more complicated. By assumption, employment income must produce income effects. At the same time, the variations in employment income are basically due to the degree of involvement in the labour market (number of weeks worked, for example) and the wage rate. If the income component can be controlled, the degree of labour force involvement should produce negative substitution effects. So should the wage rate, because it is known to be determined by the amount of human capital embodied in the person. Production of human capital, in terms of obtaining formal education and on-the-job experience, is intensive in time, and therefore, competes with child producing activities. Therefore, it is hypothesized that the direct effect of employment income, which is equivalent to the number of weeks worked times weekly wages, is negative; but there should also be a positive income effect component.

$$\frac{\partial \text{ Fertility}}{\partial \text{ EMSPS}} = \alpha_1 + 2\alpha_2 \text{ EMPSP} \quad \text{----------(2)}$$
$$(\alpha_1 < 0; \alpha_2 > 0)$$

Note that if (1) is true, (2) should be changed to:

$$\frac{\partial \text{ Fertility}}{\partial \text{ EMPSP}} = \alpha_1 + 2\alpha_2 \text{ EMPSP} + \beta_2 \text{ EDUSP} \quad \text{-------(3)}$$
$$(\alpha_1 < 0; \alpha_2 > 0; \beta_2 > 0)$$

Given (1) and (3), the regression equation takes the following form:

$$\text{Fertility} = \alpha_1 + \text{EMPSP} + \alpha_2(\text{EMPSP})^2 + \beta_2 \text{ (EDUSP x EMPSP)}$$
$$+ \beta_1 \text{ EDUSP} + \Sigma\psi X_i$$

where X_i = other independent variables (i.e. religion, residence, income, age, marriage duration)

and ψ_i = regression coefficients for other independent variables

The estimated equations are shown in Table 6-6.

The results are interesting indeed. As indicated by the higher R^2 value, this equation has performed better than any of the other equations estimated so far. All signs of coefficients are as hypothesized in (1) and (3). However, α_2--the coefficient for $EMPSP^2$--is not quite significant. Multicollinearity could potentially be held responsible for this. In all probability, both the squared term of EMPSP and the interaction term between EDUSP and EMPSP are competing to capture the income effects. When $EMPSP^2$ is dropped, the power of the estimated equation remains almost identical (regression equation 2 in Table 6-6).

In interpreting the findings, one should be cautious to distinguish between the estimating equation and the hypothesis behind it. Our aim was to provide an explanation to the puzzling finding that the fertility-education relationship for working wives is less negative or non-negative at the highest levels of education. Our contention was that the squared CLSP*EDUSP term was acting as a proxy for the interaction term of EDUSP and EMPSP, thus capturing positive income effects. In spite of the significance of the estimated coefficient for the interaction of EDUSP and EMPSP, our hypothesis could still be only conjectural, because alternative hypotheses are not completely ruled out. For example, non-linearity of the EDUSP

variable (i.e. in the working wives sample) was found to be significant as well. One may even argue that the EDUSP-EMPSP interaction might be acting as a proxy for a squared term of EMPSP, which would indicate a non-linearity in the EMPSP variable. To resolve this problem, an experiment is carried out by estimating four different equations, one with $(CLSP*EDUSP)^2$, one with $EMPSP^2$, one with the interaction term and one with all three terms (regressions 1, 2, 3, and 4 in Table 6-7). The equation with the interaction performs slightly better than the ones with the squared terms; and when all three terms are simultaneously introduced, the interaction term drives the other terms out.

6.6 Discussion of Findings

It was hypothesized that the effects of education on fertility are two-fold. First, it should have a negative component and this negative effect should be present for both the working and not working groups. Second, it should produce a positive effect if the wife is working, because her work in the market place brings some income to the family. It was also hypothesized that this positive component is a function of her employment income. These were formally presented in equation (1), with the estimated version shown below:

$$\frac{\partial \text{ Fertility}}{\partial \text{ EDUSP}} = -0.07431 + 0.0159 \text{ (EMPSP)}$$

The coefficients are highly significant and the signs are as

expected. This produces a very strong support to the hypothesis presented, hence to the theory of income effects.

According to the results presented above, the relationship between education and fertility is negative for non-working wives, but it is U shaped for working wives. The net effect of education on fertility could still be negative for many working wives who are not making enough income in their employment. Note that the average employment income for the present sample is only $1050 and the threshold value at which positive effects are equal to negative effects is $4670 (Table 6-8). In other words, only a small proportion of working women are able to enjoy a positive net fertility effect due to education.

The finding that education produces a positive income effect has many theoretical implications. So far, economists have been eager to theorize that increases in wife's education raise her value of time, and time is so intensive in the production of children and child services, and therefore, it raises the price of children and lowers the quantity demanded (Michael, 1973; Willis, 1973; Ben-Porath, 1973). Given this theory, they always expected to see a strong negative coefficient for the education variable, and even more so if the wife is working (Willis, 1973). When the empirical results were contradictory to their expectations, they declared it "strange" (Ben-Porath, 1973; p, 204) or "puzzling" (Schultz, 1973, p. 9). The solution to this puzzle lies in the correct specification of the fertility function.

Perhaps, the empirical findings of economists should be reexamined. A typical finding was reported by Willis (1973) in his famous interaction model. Working with the U.S. data, he obtained the following estimated equation:

Completed fertility = -.24836 - .17572 husbands income
+ .02023 EDUSP x HUSBANDS INCOME

According to this, fertility effects of wife's education are contingent upon the level of husbands income, and as husbands income increases the net effect of wife's education changes from negative to positive, hence a U shaped fertility-education relationship. This result was rather unacceptable to other economists (Schultz, 1973) and Willis (1973) himself. Ben-Porath (1973) theorized that higher time value of educated women is meaningful only if she is working, and therefore, working women will produce a strongly negative fertility-education profile. He agrees with Willis that education of non-working women has no pure fertility effects, or they are not predictable within the economic theory of fertility. According to him, Willis' findings are acceptable within the theory he proposes. The husband's higher earnings are associated with a higher probability of the wife not working; therefore, the positive interaction term reflects the behavior of not working wives. The implied conclusion is that the negative coefficient due to education is the only significant one for working wives; and for not working wives the education-fertility relationship could be U-shaped.

One could agree with Ben-Porath's argument that higher

earnings of husband is positively correlated with the probability of wife's not working. However, a higher probability of wife's not working does not necessarily mean that the wife is actually not working. The argument should, in fact, be the other way around. One should try to see the characteristics of women who actually work even when their husband's income is high. The selective mating hypothesis would predict husband's income, husband's education and wife's education to be positively correlated. At higher levels of husband's income, if the wife does not work, it is reasonable to expect that her level of education is relatively high and so is her employment income. This line of argument would predict that wife's education-husband's income interaction term is acting as a proxy for the squared term of wife's education (Ben-Porath (1973) agrees with this), thus an upturn of the fertility-education relationship at the higher levels of education. At higher levels of wife's education, women are more likely to work, and if they do, they are more likely to make greater employment income. Therefore, one could argue that the U shaped fertility-education relationship reflects the influence of positive income effects of those who are working, hence consistent with the findings reported in this thesis and the hypothesis of positive income effects.

6.7 A Re-examination of the Effects of Employment Status

In light of the new finginds, the effects of the employment status on fertility are to be re-examined. The most revealing finding

is that, the employment status of wife does not show any direct effect at all (Table 6-7; regression 4). This is true irrespective of the choice of variable (number of weeks worked or the dichotomy). By reducing the direct effect of employment on fertility to zero, we believe we have been successful in providing an explanation to the association between married female employment and fertility. This does not mean that there is no fertility differential by employment status of wife. It specifies the conditions under which such a relationship may exist. This exercise has identified the channels of influence in producing an association between female employment and fertility. In order to specify these channels of influence, the estimating equation has to be examined.

$$Y = \beta_1 \text{ AGE} + \beta_2 \text{ YEARSSP} + \beta_3 \text{ INCOME} + \beta_4 \text{ EDUSP}$$
$$+ \beta_5 \text{ RELIGION} + \beta_6 \text{ RESIDENCE} + \beta_7 \text{ CLSP}$$
$$+ \beta_8 \text{ CLSP*RELIGION} + \beta_9 \text{ CLSP*RESIDENCE}$$
$$+ \beta_{10} \text{ EDUSP*EMPSP} + \beta_{11} \text{ EMPSP}$$

then

$$\frac{\partial Y}{\partial \text{ CLSP}} = \beta_7 + \beta_5 \text{ RELIGION} + \beta_6 \text{ RESIDENCE}$$

β_7 is found to be not different from zero and therefore

$$\frac{\partial Y}{\partial \text{ CLSP}} = \beta_5 \text{ RELIGION} + \beta_6 \text{ RESIDENCE}$$

It should be noted that EMPSP equals zero if CLSP equals one. In other words, EMPSP acts as an interaction term of CLSP*EMPSP. Similarly, it could be argued that EDUSP*EMPSP represents a three

way interaction of EDUSP*EMPSP*CLSP. Therefore:

$$\frac{\partial Y}{\partial CLSP} = \beta_5 \text{ RELIGION} + \beta_6 \text{ RESIDENCE} + \beta_{10} \text{ EDUSP*EMPSP} + \beta_{11} \text{ EMPSP}$$

6.8 Religion and Residence

The effects of employment status on fertility due to religion and residence remain unchanged. Catholic women and rural women produce greater fertility differentials due to work status than non-Catholic women and urban women. On the average, the fertility differential due to employment status is 0.22 children more for Catholic women than for non-Catholic women, and 0.31 children more for rural women than for urban women. As indicated before, the employment status seems to be acting in a manner that produces convergence of fertility between urban and rural populations, and Catholic and non-Catholic populations.

6.9 Employment Income of Wife and Education of Wife

The fertility effects of employment status depends, to a great extent, on the amount of money made in the employment. As discussed before, this has two types of effects--negative substitution effects are captured by β_{11} EMPSP, and positive substitution effects are captured by EDUSP*EMPSP. The coefficient for negative effects (β_{11}) is much larger than the coefficient for positive effects (β_{10}). However, the true value of this coefficient depends on the level of education of the wife. If the wife has 5 years of schooling, the positive income effect is equal to .0795 EMPSP, and if she has 10

years of schooling, the positive income effect is equal to .1590 EMPSP. As long as β_{11} remains greater than β_{10} EDUSP, the fertility differential between working and non-working wives continues to increase with the increases in the level of employment income. When EDUSP is equal to 16.92 years, the negative effects become equal to positive effects; and at that level, there is no differential fertility between working and non-working wives in the continuum of the employment income of wife. Beyond this threshold value of education, employment income of wife is responsible for producing a reversed fertility pattern, in that working wives have more children than their non-working counterparts (Table 6-9). Again, this reversed differential increases as the employment income of wife increases.

How does the level of education of wife affect the relationship between fertility and the employment status of wives? According to the specification of the estimated equation, other things being equal, education stimulates higher fertility among working wives. As the level of education increases, the fertility differential due to employment status of wife is either reduced, or reversed from negative to positive.

6.10 Summary and Conclusions

This chapter presents results of a multivariate analysis of fertility, with special reference to the effects of interactions between employment status of wife and other background variables.

One major achievement of the analysis is that the contengency model presented in this chapter has provided a complete explanation of the association between employment-status of wife and number of children ever born. In other words, the model specifies the conditions under which the relationship may or may not hold. When all conditions are specified, the direct effect of employment status of wife on fertility reduces to zero. The interpretation of this should be that there is no association between employment status and fertility beyond the conditions specified in the model. Therefore, the model is said to be a complete explanation of the relationship under consideration.

This investigation finds that the fertility differential due to employment status is greater among Catholic women than non-Catholic women, among rural women than urban women and among the less educated than the more educated. This should be a rather interesting finding to those who are studying the notion of convergence of fertility levels. Catholics, rural populations and the less educated are the known sources of high fertility. Working women who represent these groups show a rather drastic reduction of fertility in comparison with their not working equals. Perhaps employment is acting as an agent for convergence of fertility between urban and rural populations, and across all categories of education. Given the importance of this phenomenon for theory as well as policy, a special effort should be made to conduct further research in this area.

The major contribution of this chapter to the study of fertility in general, and to the study of the association between fertility and wives' employment status in particular, is the empirical identification of the income effect component of female labour force particiation. It has merit in itself because it helps identify specific channels of influence in producing the fertility-education association and fertility-employment association. It contributes to theory by providing an explanation to the observed phenomenon and by resolving certain problems encountered by students of fertility.

CHAPTER 7

CONCLUSIONS

7.1 Summary

This is a cross sectional study of the relationship between fertility and employment of wives in Canada. The sample consisted of one percent of 45-64 years old Canadian wives, living with their husbands, in 1971. The data were obtained from the family file of the Public Use Sample Tapes.

A brief review of the relevant literature was provided in Chapter 2. With respect to the relationship between female employment and fertility, the sociological perspective offer two interrelated but analytically different explanations: the role incompatability explanation and the sex-role orientation explanation. According to the former, a conflict is said to occur in the roles of the mother and the worker. It is hypothesized that working wives minimize the degree of conflict by reducing their fertility. The latter is essentially a spuriousness hypothesis which deals with the variation in fertility among working wives. According to this approach, working wives who belong to the role-modern orientation tend to have fewer children than those who belong to the role-traditional orientation. Thus, the sex role orientation of the working wife is considered the key explanation of the fertility variation among working wives.

The economic perspective employs a utility maximization model and a home production model to explain the negative association of female employment and fertility. The key hypothesis is the cost of time or the opportunity costs hypothesis. According to this explanation, the cost of time as measured by the level of education interacts with the employment status of wife in such a way as to produce greater fertility differentials due to work status among the highly educated, and smaller fertility differentials due to work status among the poorly educated.

In Chapter 3, a description of and the rationale for the major variables used was presented. Number of children ever born was used as the dependent variable throughout the study. Number of weeks worked and a binary variable were alternatively utilized to indicate employment status of wife. Age of wife and duration of marriage were considered only as control variables and no analysis was presented on the basis of them. Total family income minus wife's employment income, wife's level of education measured by the number of years of schooling, wife's religion measured by the categories of Catholic and non-Catholic, wife's ethnic identification, and family's place of residence indicated by rural and urban categories were used as background variables.

In Chapter 4, a preliminary attempt was made to explain fertility differentials due to employment status. The sample was grouped into all categories of each background variable, and the employment-fertility relationship was examined within these

categories. Mutliple Classification Analysis was performed to see the possibility of explaining the fertility differential due to employment status of wife by categories of independent variables. Background variables were able to explain a considerable amount of the fertility employment relationship, but within most of the sub samples this relationship remained statistically significant. Only among several income categories did this relationship become statistically non-significant.

The fertility employment relationship was subjected to tests of spuriousness in Chapter 5. The first test with a multiple regression model was unable to establish the hypothesis that the employment-fertility relationship is spurious. A somewhat richer hypothesis, that working women have fewer children not because they are actually working but because they represent socio-economic and demographic characteristics which are conducive to lower fertility, was subjected to a statistical examination. On the basis of the known characteristics, the sample was divided into two segments, one called "working type" and the other "not working type", by the method of discriminant analysis. It was found that:

(a) The working type women have fewer children than actually working women, and the non-working type women have more children than actually not working women;

(b) the actual work status does produce fertility differentials within both the working and the non-working type groups; and

(c) the "type" classification has more power in predicting fertility than the actual classification of work.

A multivariate analysis of the fertility-employment relationship was performed in Chapter 6. After establishing that the dichotomous employment variable is not desirable in a regression model designed to explain fertility, several interaction models was successfully estimated. The final form of the model produced a complete statistical explanation of the relationship between employment and fertility. This was achieved by reducing the coefficient due to employment status to zero. Some of the important findings are enumerated in the following paragraph.

First, it was found that the relationship between employment and fertility is completely contingent upon various socio-economic and demographic characteristics of wives. The difference between the number of children borne by working women and non-working women was smaller in urban areas than in rural areas, among non-Catholic groups than Catholic groups, and among the well educated than the less educated. Second, it was found that at higher levels of education and at higher levels of employment income, working wives do produce more children than their non-working sisters. It was theorized that this reversed fertility differential was due to greater income effects of employment at the highest level of education and employment income.

7.2 Theoretical and Methodological Implications

Much of the present knowledge accumulated within the subject matter of demography is due to numerous studies of fertility differentials. We are, for example, aware of the existence of considerable differences in fertility by religious denominations, residence, ethnicity, levels of mortality, income, education and also socio-economic status, and in different geographic areas. Our knowledge, however, is less than adequate as to why these differences differ, or even as to why these differences occur in the first place. It is hoped that the research reported in this thesis provides a modest contribution toward filling this knowledge gap, especially in reference to the association between married female employment and fertility.

Concepts of working types and not working types are developed in this thesis. The "type" concepts are folklore in sociological theory. However, more often than not, the type concepts are used in theoretical discussions only. Hardly any attention has been given toward empirical construction of a type concept. The attempt made in this study to empirically construct a type concept might not be a complete success. However, empirically constructed typical groups have helped us to test richer hypotheses regarding the association between employment of wives and fertility. Also, this type classification has proven to be a more powerful predictor of fertility than the actual classification of work. This has helped us understand why some working wives do not reduce fertility and why many non-working

wives experience very low fertility. Much of the accumulated scientific knowledge is derived by classifying populations into unique groups and comparing these groups against one another. We believe that theoretical development and empirical construction of type concepts facilitates this knowledge building process.

Another theoretically and methodologically unique aspect of this thesis is the development and application of a contingency model to explain an empirically observed relationship between two variables. The argument is that the explanation of an association between two variables is achieved if the measure of the association is reduced to zero. This could be done only if all sources of influence in producing this association are understood and specified in the model. This thesis presents a classic example of a complete explanation.

By introducing the economic concept of income effect and estimating the same, this study has resolved a theoretical problem that many students of fertility had encountered. The claim is made that the employment of wife does produce positive income effects but the magnitude of this depends on the level of wife's education and employment income. It is also claimed that some empirical findings, which were considered theoretically atypical, do indeed fall within a more elaborate version of the economic theory of fertility.

7.3 Policy Implications

Should we recommend a policy to encourage female labour force

participation in order to achieve a lower level of fertility? This study would suggest the appropriateness of a moratorium on the implementation of the policy, until the socio-economic and demographic aspects of the target population are well studied.

There are at least two findings of this study that merit further consideration from the point of view of policy. First is the finding that those who belong to the working type category of women have as fewer children as those who actually work; and not working type women have even more children than those who actually do not work. This, together with the fact that many actually not working but working type women had fewer children than a fair proportion of those who did participate in the labour force but did not belong to the working type, should make the policy analyst cautious as to the relative effectiveness of a policy to encourage female participation in the labour force in order to lower the levels of fertility. Our findings clearly indicate that the membership in the working type group produces greater impact in favour of lower fertility than the membership in the actual work force. It may well be that being a working type person is a necessary precondition for lower fertility. The second important finding, from the policy point of view, is that the degree to which fertility is suppressed by working wives is contingent upon many socio-economic and demographic characteristics. Under certain circumstances, however rare they may be, employment does induce higher fertility. In our sample, highly educated, well paid, urban, non-Catholic women belong to this

group. Understandably, a population with these characteristics may never have a population problem, hence hardly any need for a policy to control population.

To summarize, on the one hand there are many actually working women not being able to curtail fertility. They are identified to be the not working type people. They are likely to be older, less educated, living in rural areas, Catholics, who are probably in the labour force out of financial necessity. On the other hand, there is an exclusive group of working women who show no difference in fertility behavior in comparison with their non-working counterparts. They are highly educated, non-Catholic residents of urban centres who make very high employment income. There is similarity between these two groups, in that they show no, or minimum fertility differentials due to actual work status. However, the first group is characterized by their high fertility while the other group experiences very low fertility. A population control policy is not needed for the latter group, and a population control policy that encourages female employment is not effective in the former group.

7.4 Limitations and Suggestions for Further Research

One obvious limitation of this study is the temporal incongruity of the measurement of major variables. The number of children ever born is an acceptable measure of completed fertility, but it relates to past fertility behaviour. Temporal reference of the employment variable extend only for a period of one year. It could

be argued that the present study is essentially a study of the association between current employment status and past fertility. However, we depend on the finding that present employment status is a good predictor of past employment status (Collishaw, 1976).

Another limitation of the study is the possible endogeneity of the labour force status variable. The functional form of the models estimated in the study is based on the assumption that the labour force behaviour of women is predetermined. There is evidence to suggest that the level of fertility is a prime determinant of the labour force behaviour of married women. In the present study, it has been assumed that the most recent employment experience of married women is a function of their part labour force behaviour. Current labour force behaviour could well be determined by past fertility behaviour.

To design and carry out research to avoid the problems cited above is no easy task. There seems to be only one way to overcome these limitations. That is to study a cohort through all its reproductive years. Whether such research is going to be practical or affordable is yet to be known. There are some statistical techniques, such as the two stage least squares method, that could be employed to minimize the second limitation. But, the kind of data available from a census are hardly adequate for the application of such techniques. In addition, to examine all possible endogeneities, one must have a set of elaborate theories which cut across many disciplines. Employment status of wife may be an endogenous variable.

So may be income or even level of education. It is unlikely that one is going to be equipped with all the necessary theories to model the whole socio-economic and demographic system. Even if one is blessed with such knowledge, the type of data required to test such a model would be hard to come by.

Another limitation associated with this thesis has to do with the specific sample chosen. General fertility behaviour of women who were 45-64 years old in 1971 has not been uniform. In this sample, the younger cohorts spent their reproductive years contributing to the baby boom, while the older cohorts were forced to curtail their fertility during the depression. As a result, this sample is characterized by the highest fertility among the youngest and the lowest fertility among the oldest. This is confounded by the fact that younger cohorts were more educated, more likely to be rich, more likely to be in the labour force and a greater proportion of them lived in urban centres, in comparison with the older cohorts. Note that all these characteristics are generally identified with lower fertility. When one finds a positive coefficient for the income variable (as we do), can we be sure that we are capturing fertility effects due to income? Or, when a positive relationship between education and fertility at the top levels of education is found, can we be sure that we are capturing true fertility effects of education? The alternative explanation would be that younger cohorts were able to achieve higher education and were able to be richer than older cohorts but happened to have more children purely

due to the trend of the era. For obvious reasons, this is a disturbing thought to the author. Our only consolation is that this trend may have been well captured in the age of wife variable. Note that the coefficient for the age variable is strongly negative. Usually in fertility studies age produces a strong positive coefficient. Perhaps this trend factor is totally captured by the age of wife variable and our concerns are unwarranted. However, further research is called for, both in making sure of our inferences, and in resolving this concern. This could be accomplished by detrending the number of children variable and performing the analysis on the detrended fertility measure. Alternatively, the analysis may be performed on various narrower cohorts, such as 45-49 and 50-54, to see if the results remain valid within these sub-samples.

As indicated before, it was found that working wives of traditionally high fertility groups, such as rural populations, Catholics and the less educated, reduce fertility at a much higher rate than working wives of non-Catholic denominations, urban areas, and who are well educated. At the same time, we are now beginning to see convergence of fertility across all socio-economic and demographic groups. It will be of great interest to study the effect of employment status on this convergence process.

Table 1-1

FEMALE LABOUR FORCE PARTICIPATION RATES: CANADA 1921 - 1971

Year	Married Female Participation Rate	Married Women As % of the Female Labour Force
1921	2.16	7.25
1931	3.45	10.07
1941	3.79	10.30
1951	11.20	30.02
1961	21.95	49.77
1971	36.90	60.01

SOURCE : Skoulas (1976) Table 1-1

Statistics Canada, 1971 Census of Canada, Catalogue 94-774

Table 4-1

AVERAGE NUMBER OF CHILDREN EVER BORN CLASSIFIED BY NUMBER OF WEEKS WORKED IN 1970 BY WIVES 45 - 64 YEARS

Number of Weeks Worked	Number of Children Born
Did Not Work During 1970	3.02
1 - 13 Weeks	2.97
14 - 26 Weeks	2.65
27 - 39 Weeks	2.63
40 - 48 Weeks	2.54
49 - 52 Weeks	2.36

Table 4-2

AVERAGE NUMBER OF CHILDREN EVER BORN BY EMPLOYMENT STATUS OF WIFE FOR CATEGORIES OF BACKGROUN VARIABLES: WOMEN 45 - 64 YEARS, CANADA 1971

	Working Wives	Non Working Wives	Working Wives - Non Working Wives
Income			
Less Than $ 5,000	2.45	3.02	-.57
$ 5,000 - $10,000	2.41	2.92	-.51
$10,000 - $15,000	2.69	3.14	-.45
$15,000 - $20,000	2.97	3.11	-.14
$20,000 & Over	2.71	3.14	-.43
Education			
Less Than Grade 9	2.85	3.37	-.52
Grade 9 - 10	2.50	2.82	-.32
Grade 11	2.40	2.74	-.34
Grade 12	2.30	2.56	-.26
Some University	2.39	2.49	-.10
University Degree	2.18	2.05	+.13
Residence			
Urban	2.46	2.84	-.60
Rural	2.99	3.50	-.51
Religion			
Catholic	2.86	3.46	-.60
Non-Catholic	2.39	2.67	-.28
Ethnicity			
English	2.48	2.74	-.26
French	3.00	3.57	-.57
Other	2.39	2.91	-.52

Table No. 4-3

Number of Children Ever Born (Net Age and Marriage Duration) by Work Status of Wife

For All Categories of Income; Deviations from the Category Mean; Wives 45-64 Years: Canada 1971

	N	Less than $5000	Adjusted*	N	$ 5000-$10000	Adjusted	N	$10000-$15000	Adjusted	N	$15000-$20000*	Adjusted*	N	$20000+ Over	Adjusted*
Working	530	-.31	-.12	1061	-.34	-.19	556	-.29	-.10	193	.11	.06	133	-.31	-.15
Not Working	1278	.13	.05	1813	.20	.11	1034	.15	.05	444	.05	-.03	343	.12	.06
Mean		2.85			2.73			2.98			3.07			3.02	
Independent Variables			Beta			Beta			Beta			Beta			Beta
Work Status			.04*			.08			.04*			.02*			.06*
Religion			.08			.11			.19			.21			.28
Residence			.15			.12			.18			.09			.16
Ethnicity			.08			.10			.06*			.09*			.12*
Education			.11			.11			.12			.21			.13*

* Not significant at .05 level

Table No. 4-4

Number of Children Ever Born (Net Age and Marriage Duration) by Work Status of Wife

For All Categories of Residence Deviations from the Category Mean; Wives 45-64 Years: Canada 1971

	N	Urban	Adjusted	N	Rural	Adjusted
Working	2058	-.25	-.12	415	-.36	-.21
Not Working	3542	.18	.07	1370	.11	.06
Mean		2.70			3.38	
Independent Variables			Beta Values			Beta Values
Work status			.05			.06
Income			.11			.13
Ethnicity			.09			.10
Religion			.13			.14
Education of Wife			.12			.10

Table No. 4-5

Number of Children Ever Born (Net Age and Marriage Duration) by Work Status of Wife

For All Categories of Ethnicity Deviations from the Category Mean; Wives 45-64 Years: Canada 1971

	N	British	Adjusted	N	French	Adjusted	N	Other	Adjusted
Working	1359	-.17	-.10	433	-.38	-.05	686	-.29	-.15
Not working	2245	.10	.06	1456	.11	.08	1211	.17	.08
Mean		2.64			3.44			2.72	
Independent Variables			Beta			Beta			Beta
Work Status			.04			.07			.06
Residence			.12			.16			.18
Religion			.16			.03*			.06
Income			.09			.15			.12
Education			.11			.13			.12

*Not significant.

Table No. 4-6

Number of Children Ever Born (Net Age and Marriage Duration) by Work Status of Wife

For All Categories of Religion Deviations from the Category Mean; Wives 45-64 Years: Canada 1971

	N	Catholic	Adjusted	N	Non Catholic	Adjusted
Working	813	-.39	-.25	1660	-.17	-.09
Not working	2206	.14	.09	2706	.10	.05
Mean		3.30				
Independent Variables			Beta			Beta
Work Status			.07			.04
Residence			.13			.13
Ethnicity			.12			.05
Education			.09			.14
Income			.15			.08

Table No. 4-7

Number of Children Ever Born (Net Age and Duration of Marriage) by Work Status of Wife

For All Categories of Education of Wife Deviation from the Category Mean; Wives 45-64 Years: Canada 1971

	N	Less than 9	Adjusted	N	Grade 10	Adjusted	N	Grade 11	Adjusted	N	Grade 12	Adjusted	N	Some* Univ.	Adjusted	N	Univ. Degrees	Adjusted
Working	778	-.37	-.20	580	-.24	-.15	343	-.24	-.16	411	-.18	-.12	289	-.02	.03	.72	.06	.15
Not working	2411	12	.06	1119	.13	.08	483	.17	.11	533	.14	.09	308	.02	-.03	-.58	-.07	-.19
Mean		3.24			2.71			2.60			2.45			2.44			2.12	
Independent Variables			Beta			Beta			Beta			Beta			Beta			Beta
Work Status			.06			.06			.08			.06			.02*			.11*
Religion			.07			.15			.14			.23			.20			.13*
Residence			.15			.15			.12			.15			.10			.28
Ethnicity			.13			.06*			.05*			.04*			.04*			.15*
Income			.12			.10			.06*			.16			.14			.38

* Not significant at .05 level

Table 5-1

REGRESSION ON NUMBER OF CHILDREN EVER BORN: A PRELIMINARY TEST FOR SPURIOUSNESS OF FERTILITY-EMPLOYMENT ASSICIATION (t VALUES IN PARANTHESES)

Independent Variables	Regression Coefficients and (t Values)			
	(1)	(2)	(3)	(4)
Work Status of Wife (CLSP) (1 = working, 0 = not working)	-.485 (12.1)		-.213 (4.9)	
Number of Weeks Worked (WWSP)		.012 (12.4)		-.006 (6.3)
Education (EDUSP)			-.063 (8.6)	-.062 (8.6)
Income			.029 (9.7)	.029 (9.7)
Age			-.088 (20.3)	-.088 (20.3)
Marriage Duration (YEARSSP)			.105 (28.9)	,105 (28.9)
Religion of Wife (1 = Catholic, 0 = non-Catholic)			.682 (14.3)	.678 (14.3)
Residence (1 = urban, 0 = rural)			-.597 (14.5)	-.588 (14.3)
Ethnic Background of Wife (ETHNICITY) (1 = non-French, 0 = French)			-.041 (0.8)	-.042 (0.8)
R^2	.12	.13	.19	.19

Table 5-2

RESULTS OF DISCRIMINANT ANALYSIS OF WORKING AND NOT WORKING GROUPS WITH INCOME, EDUCATION, RESIDENCE, AND AND RELIGION AS DISCRIMINATING VARIABLES

Discriminating Variables	Standardized Canonical Discriminant Function Coefficients
Income	.41447
Education	-.58876
Residence	-.45603
Age	.56472
Religion	.28862
Canonical Correlations	0.28897
Eigenvalue	0.09111
Wilks Lambda	0.9164948
Chi Squared	645.58
Degrees of Freedom	5
p	0.000

Table 5-3

DISCRIMINANT ANALYSIS CLASSIFICATION RESULTS

Actual Group	N	Predicted Group Membership: Not Working	Predicted Group Membership: Working
Not Working	4,920	3,003 (61.0%)	1,917 (39.0%)
Working	2,488	887 (35.7%)	1,601 (64.3%)
Total	7,408	3,890	3,518

Percent Correctly Classified: 62.15%

Table 5-4

AVERAGE NUMBER OF CHILDREN EVER BORN CLASSIFIED BY WIVES' ACTUAL EMPLOYMENT STATUS AND THEIR PREDICTED PROPENSITY TO WORK: WOMEN 45-64 YEARS CANADA 1971

Predicted Propensity to Work	Actual Work Status: Working	(N)	Not Working	(N)	Total	(N)
Working Type	2.32	(1,601)	2.64	(1,917)	2.52	(3,518)
Not Working Type	2.82	(887)	3.28	(3,003)	3.17	(3,890)
Total	2.54	(2,488)	3.02	(4,920)	2.86	(7,408)

Table 5-5

MULTIPLE CLASSIFICATION ANALYSIS OF THE NUMBER OF CHILDREN EVER BORN BY WORKING TYPE WOMEN AND NOT-WORKING TYPE WOMEN

WORKING TYPE WOMEN

VARIABLE	N	UNADJUSTED DEVIATIONS	DEVIATIONS ADJUSTED FOR AGE AND DURATION OF MARRIAGE
Actual Work Status			
Working	1,601	-0.20	-0.14
Not Working	1,917	0.11	0.11

Grand Mean = 2.52

R^2 = 0.127

F = 22.3

p = 0.000

NOT WORKING TYPE WOMEN

VARIABLE	N	UNADJUSTED DEVIATIONS	DEVIATIONS ADJUSTED FOR AGE AND DURATION OF MARRIAGE
Actual Work Status			
Working	887	-0.35	-0.33
Not Working	3,003	0.10	0.10

Grand Mean = 3.17

R^2 = 0.128

F = 34.8

p = 0.000

Table 5-6

MULTIPLE CLASSIFICATION ANALYSIS OF THE NUMBER OF CHILDREN EVER BORN BY WORKING WOMEN AND NOT WORKING WOMEN

WORKING WOMEN

VARIABLE	N	UNADJUSTED DEVIATIONS	DEVIATIONS ADJUSTED FOR AGE AND DURATION OF MARRIAGE
Predicted Work Status			
Working Type	1,061	-0.16	-0.21
Not Working Type	887	0.28	0.38

Grande Mean = 2.54

R^2 = 0.139

F = 61.5

p = 0.000

NOT WORKING WOMEN

VARIABLE	N	UNADJUSTED DEVIATIONS	DEVIATIONS ADJUSTED FOR AGE AND DURATION OF MARRIAGE
Predicted Work Status			
Working Type	1,917	-0.39	-0.54
Not Working Type	3,003	0.25	0.35

Grande Mean = 3.03

R^2 = 0.14

F = 232.3

p = 0.000

Table 5-7

NUMBER OF CHILDREN EVER BORN FOR THE CATEGORIES OF ACTUAL EMPLOYMENT STATUS AND PREDICTED PROPENSITY TO WORK

	Average Number of Children		N	Percent
Actual				
Working	2.54		2,488	34%
Not Working	3.02		4,920	66%
Fertility Differential		0.48		
Predicted				
Working	2.52		3,518	47%
Not Working Type	3.17		3,890	53%
Fertility Differential		0.65		
TOTAL	2.86		7,408	

Table 5-8

ANALYSIS OF VARIANCE OF NUMBER OF CHILDREN EVER BORN WITH ACTUAL AND PREDICTED EMPLOYMENT STATUS AS INDEPENDENT VARIABLES AND AGE AND DURACTION OF MARRIAGE AS COVARIATES

Source of Variation	Sum of Squares	F	p
Covariates	2751.985	455.99	.000
Main Effects			
Actual Work Status	167.563	55.53	.000
Predicted Work Status	884.704	293.19	.000
Interaction	14.346	4.75	.029
Total Explained	4006.488	265.55	.000
Total Unexplained	22335.980		
Total Variation	26342.469		

Table 5-9

MULTIPLE CLASSIFICATION OF NUMBER OF CHILDREN EVER BORN WITH ACTUAL AND PREDICTED EMPLOYMENT STATUS AS INDEPENDENT VARIABLES AND AGE AND DURATION OF NARRIAGE AS COVARIATES

VARIABLE	N	UNADJUSTED DEVIATIONS	ADJUSTED DEVIATIONS
Actual Employment			
Working	2,488	-.32	-.22
Not Working	4,920	.16	.11
Predicted Employment			
Working Type	3,518	-.34	-.42
Not Working Type	3,890	.31	.38

Grand Mean: 2.86

R^2 : 0.152

Table No. 6-1

Regression on Number of Children Ever Born For Total Sample

Working Wives Sample and Non Working Wives Sample (t Values in Parentheses)

	Religion	Residence	Age	Marriage Duration	Income	Education	E.S.S.*	N	R^2
Working Wives	.54672 (7.7)	-.07536 (6.1)	-.07536 (10.4)	-.09964 (18.1)	.02720 (5.2)	-.04116 (3.7)	6374	2488	.16142
Non Working Wives	.76626 (14.6)	-.66759 (13.0)	-.09379 (17.2)	.10864 (22.8)	.03015 (8.6)	.07543 (8.5)	14823	4920	.19283
Total	.71756 (16.9)	-.62058 (15.2)	-.08521 (19.7)	.10572 (29.0)	-.06962 (10.1)	.21346 (10.0)	21346	7408	19003

* Error scum of squares

Religion : Catholic = 1
Non Catholic = 0

Residence: Urban = 1
Rural = 0

Table No.6-2

Regression on Number of Children Ever Born:

Interaction Model Number 1 (t Values in Parentheses).

	Religion	Residence	Age	Marriage Duration	Education	Income	CLSP	WWSP	CLSP* Education	CLSP* Income	CLSP* Religion	CLSP* Residence	R^2
Equation 1	.76618	-.67329	-.08773	.10513	-.07543	.03073	-.58250		.03505	-.00471	-.22091	.25831	.19525
	(15.0)	(13.4)	(20.1)	(29.0)	(8.7)	(8.5)	(3.6)		(2.4)	(.07)	(2.4)	(2.9)	
Equation 2	.78606	.66806	-.08730	.10513	-.06985	.03105		-.01034	.02157	-.00712	-.28218	.25526	.19746
	(15.9)	(13.4)	(20.1)	(29.0)	(8.8)	(8.6)		(5.8)	(2.2)	(1.09)	(3.4)	(3.0)	
Equation 3	.76624	.67338	-.08763	.10510	-.07543	.03074	.27390	-.00921	.03877	-.00575	-.22719	.28217	.19773
	(15.)	(13.5)	(20.1)	(28.9)	(8.7)	(8.6)	(1.6)	(4.8)	(2.7)	(.08)	(2.5)	(3.2)	

Table 6-4

SOURCES OF EFFECTS OF EMPLOYMENT STATUS OF WIFE ON NUMBER OF CHILDREN EVER BORN

Source of Effect	$\frac{\partial Y}{\partial CLSP}$	$\frac{\partial Y}{\partial CLSP}\Big\vert_{\bar{x}}$
Residence (Urban = 1)	.25526	.25526
Religion (Catholic = 1)	-.28218	-.28218
Education	.02157	.19720
Number of Weeks Worked	-.01034	-.13168

Total Effects:			
	Catholic	- Urban	+.03860
	Catholic	- Rural	-.29386
	Non Catholic	- Urban	+.32078
	Non Catholic	- Rural	+.06552

SOURCE: Regression 2, Table 5-2

Table 6-3

SOURCES OF EFFECTS OF EMPLOYMENT STATUS OF WIFE ON NUMBER OF CHILDREN EVER BORN

Source of Effect	$\frac{\partial Y}{\partial CLSP}$	$\frac{\partial Y}{\partial CLSP}\Big\vert_{\bar{X}}$
Residence (Urban = 1)	.25831	.25831
Religion (Catholic = 1)	-.22091	-.22091
Education	.03505	.32045
Direct (CLSP)	-.58250	-.58250
Total Effects:	Catholic - Urban	-.22465
	Catholic - Rural	-.48296
	Non Catholic - Urban	-.00374
	Non Catholic - Rural	-.26205

SOURCE: Regression 1, Table 6-2

Table No. 6-5

Regression on Number of Children Ever Born:

Tests for Non-Linearities (t Values in Parentheses)

Regression Number	Religion	Residence	Age	Marriage Duration	Income	Education (EDUSP)	CLSP	CLSP* EDUSP	(CLSP* EDUSP)^2	(EDUSP)^2	CLSP* Residence	CLSP* Religion	R^2
1.	.78601	-.67709	-.08788	.10527	.02883	-.08900	-.27349			.00146	.25785	-.27382	.19477
	(15.6)	(13.6)	(20.1)	(28.9)	(9.4)	(3.8)	(3.7)			(1.1)	(3.0)	(3.1)	
2.	.76746	-.66968	-.08794	.10520	.02917	-.08604	-.57595	.03042		.000698	.24716	-.22305	.19522
	(15.0)	(13.5)	(22.0)	(28.9)	(9.5)	(3.7)	(3.5)	(2.1)		(0.5)	(2.9)	(2.5)	
3.	.76421	-.66777	-.08803	.10526	.02925	-.07587	-.46992		.00185		.24285	-.21865	.19541
	(15.0)	(13.4)	(22.4)	(28.9)	(9.6)	(9.0)	(4.5)		(2.7)		(2.8)	(2.4)	
4.	.76663	-.66918	-.08775	.10509	.02932	-.07455	-.59740	.03265			.24741	-.22028	.19519
	(15.3)	(13.5)	(22.0)	(28.9)	(9.5)	(8.7)	(3.7)	(2.3)			(2.8)	(2.4)	

Table No. 6-6

Regression on Number of Children Ever Born:

A Test for Income Effects (t Values in Parantheses)

Regression Number	Religion	Residence	Age	Marriage Duration	Income	Education (EDUSP)	Employment Income of Wife (EMPSP)	EMPSP	EDUSP* EMPSP	CLSP* Religion	CLSP* Residence	CLSP	R^2
1	.76883 (15.2)	-.67301 (13.6)	.08731 (20.1)	.10470 (28.9)	.03011 (9.9)	-.07361 (9.5)	-.30152 (7.1)	.00435 (1.6)	.01516 (5.1)	-.22349 (2.5)	.31310 (3.6)	.05040 (0.6)	.20153
2	.76779 (15.2)	-.67353 (13.7)	.08716 (21.8)	.10464 (29.1)	.03039 (10.1)	-.07431 (9.6)	-.26909 (7.1)		.01592 (5.5)	-.21841 (2.5)	.30859 (3.6)	.00317 (0.1)	.20127

Table No. 6-7

Regression on Number of Children Ever Born:

Tests for Alternative Hypothesis (t Values in Parentheses)

Regression Number	Religion	Residence	Age	Marriage Duration	Income	Education (EDUSP)	CLSP	EMPSP	$(EDUSP * CLSP)^2$	$EMPSP^2$	EDUSP* EMPSP	CLSP* Religion	CLSP* Residence	R^2
1	.76317	-.67011	.08707	.10479	.02998	-.07676	-.34728	-.09360	.00315			-.20206	.28278	.20017
	(15.2)	(13.1)	(21.8)	(29.1)	(9.8)	(9.1)	(3.3)	(6.7)	(4.5)			(2.3)	(3.3)	
2	.76862	-.68291	.08660	.10462	.02923	-.06931	-.02733	-.13989		.00648		-.22949	.31013	.19869
	(16.0)	(14.0)	(20.9)	(29.1)	(9.7)	(8.8)	(0.3)	(4.8)		(2.5)		(3.1)	(3.9)	
3.	.76779	-.67353	.08716	.10464	.03039	-.07431	.00317	-.26909			.01592	.21841	.30859	.20127
	(15.2)	(13.7)	(21.8)	(29.1)	(29.1)	(10.1)	(9.6)	(7.1)			(5.5)	(2.5)	(3.6)	
4.	.76390	-.67075	.08739	.10476	.03007	-.07629	.03695	-.27628	.00088	.00453	.01254	.21021	.30676	.20161
	(15.)	(13.5)	(21.6)	(29.1)	(10.0)	(9.1)	(0.3)	(5.3)	(0.1)	(1.6)	(3.0)	(2.4)	(3.6)	

Table 6-8

EFFECTS OF EDUCATION ON NUMBER OF CHILDREN EVER BORN

Non Working Women		-0.07431
Working Women		
	Employment Income	Total Net Effect
	$ 1,000	-0.05839
	$ 2,000	-0.04247
	$ 3,000	-0.02655
	$ 4,000	-0.01063
	$ 5,000	+0.00529
	$ 6,000	+0.02121
	$ 7,000	+0.03713
	$ 8,000	+0.05305
	$ 9,000	+0.06897
	$10,000	+0.08489

SOURCE: Regression 2, Table 5-7

Table No. 6-9

Effects of Employment on Number of Children Ever Born

Through The Interaction Between Employment Income and Education of Wife

Level of Education	Level of Employment Income					
	$1000	$2000	$3000	$4000	$5000	$6000
7	-.1578	-.3156	-.4734	-.6312	-.7890	-.9468
9	-.1260	-.2520	-.3780	-.5040	-.6300	-.7560
11	-.0942	-.1884	-.2826	-.3768	-.4710	-.5652
13	-.0624	-.1248	-.1872	-.2496	-.3120	-.3744
15	-.0306	-.0612	-.0918	-.1224	-.1530	-.1836
17	+.0012	+.0024	+.0036	+.0048	+.0060	+.0072
19	+.0330	+.0660	+.0990	+.1320	+.1650	+.1980

Source: Regression 2, Table 6-6

Chart 6-1

Number of Children Ever Born and Wife's Education:

A Hypothetical Situation

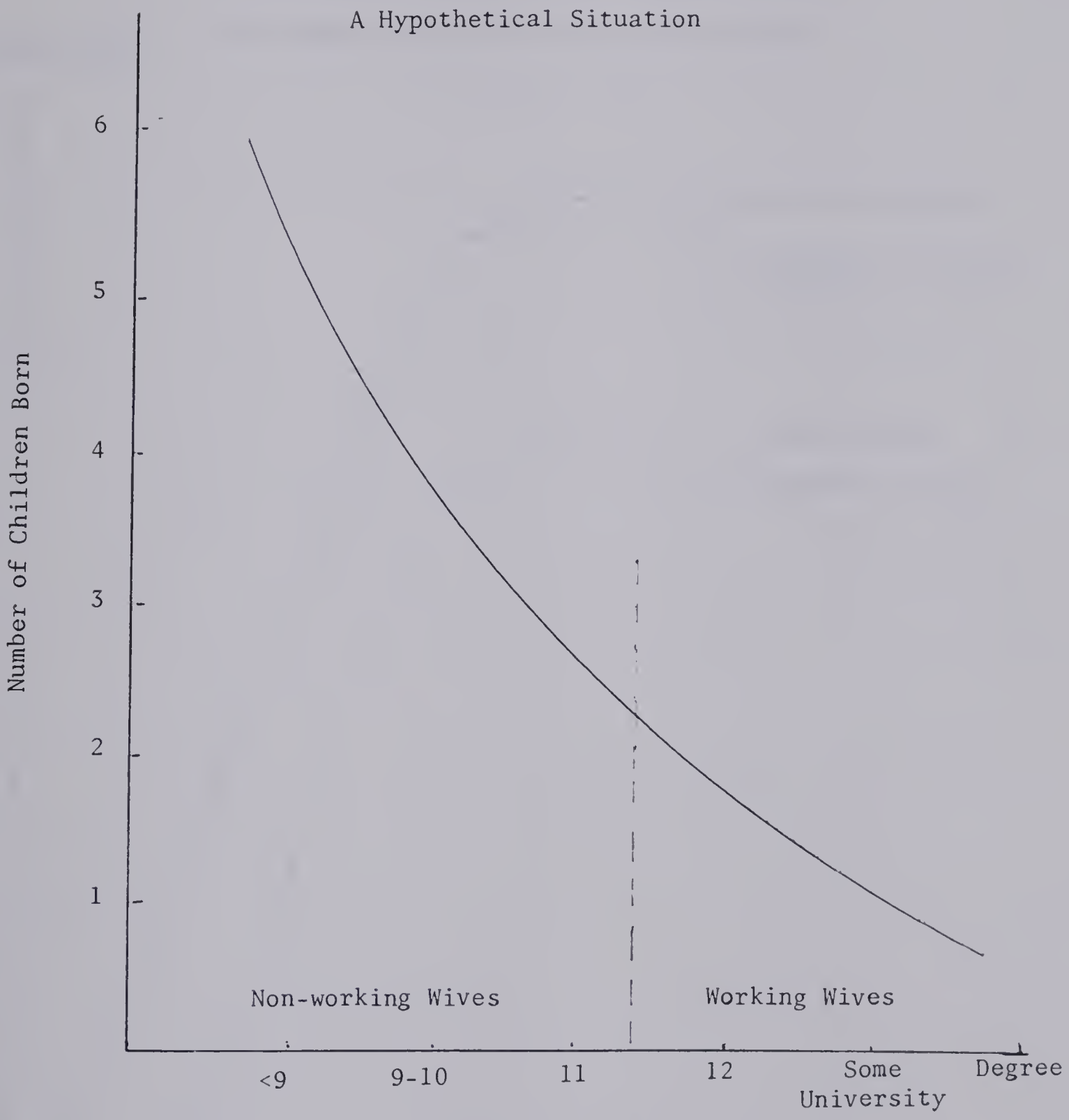


Chart 4-1

Children Born per 1000 Women by

Age Groups and Work Activity, for Canada

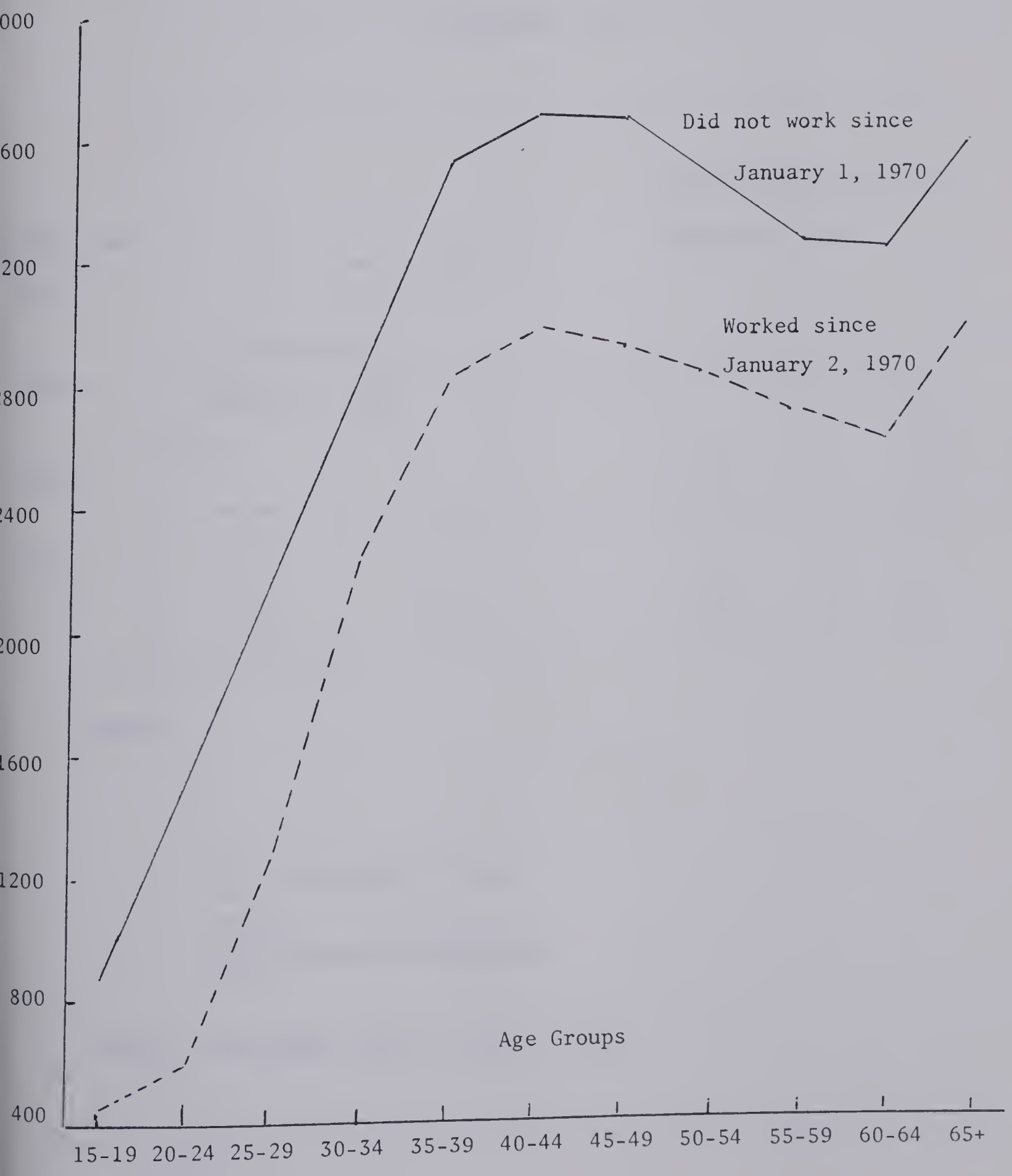
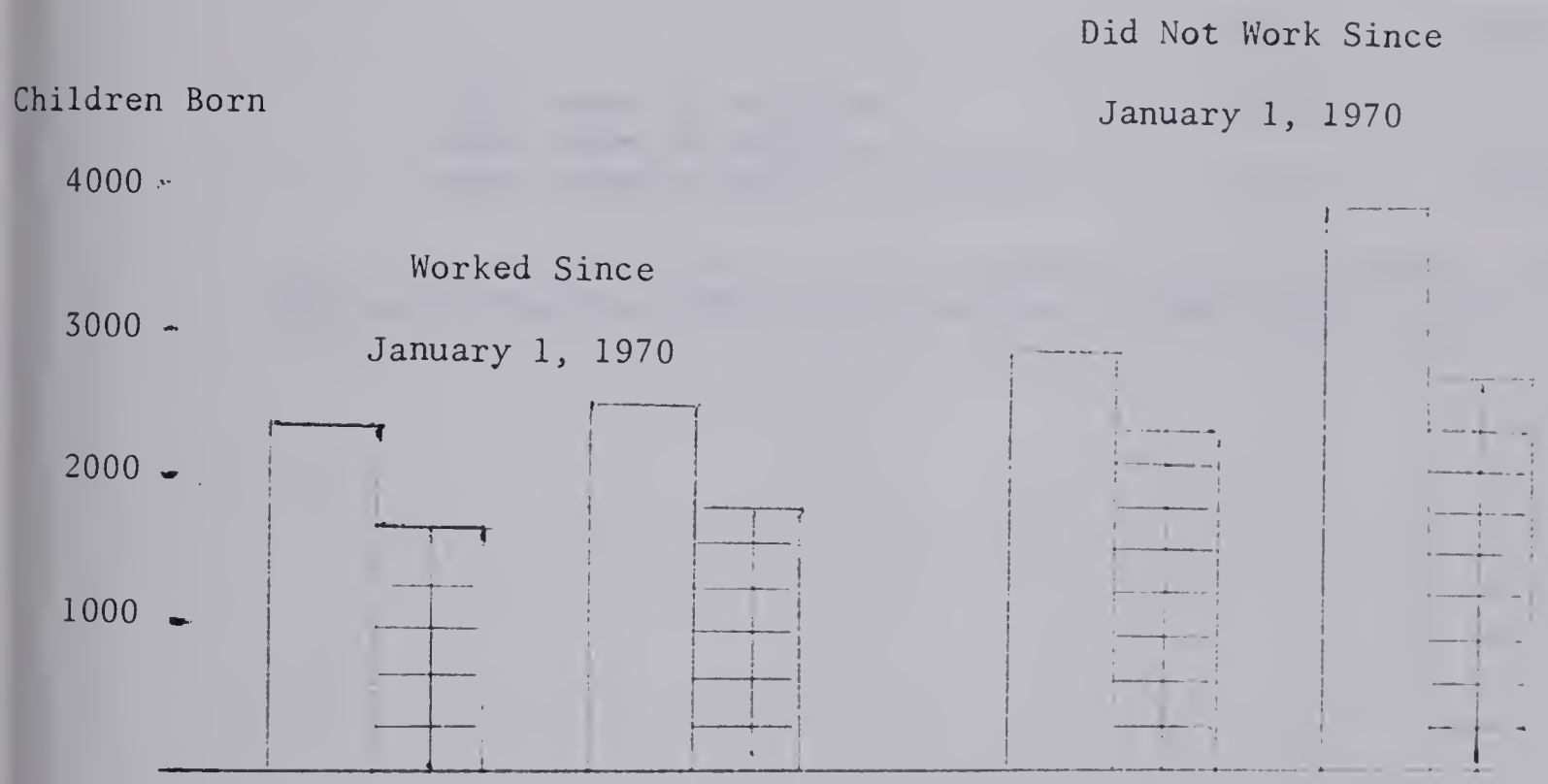


Chart 4-2

Children Born per 1000 Women Ever Married

by Work Activity and Education,

for Canada, 1971



Legend

Secondary or Less

Some Post-Secondary

Source: Collishaw, 1976, p. 52.

Footnotes

[1]Religion is measured as follows: Catholic = 1, Non-Catholic = 0

[2]Residence is measured as follows: Urban = 1, Rural = 0.

[3]One may wonder if multicollinearity is responsible for this result. Standard errors for respective coefficients are as follows:

	CLSP	WWSP
CLSP alone in equation	.16152	
WWSP alone in equation		.00179
Both CLSP and WWSP in equation	.17372	.00193

A slight increase in the standard errors is evident. However, the coefficient for CLSP drops drastically from .5825 to .2739.

Bibliography

Adelman, I.
1963 "An Econometric Analysis of Population Growth". American Economic Review. 53

Allen, J.
1971 "Alternative Steps to Fertility Control". Population Index. 37

Allingham, J.
1967. Women Who Work: Part 1. Queens Printer, Ottawa.

Allingham, J. and Spencer, B.
1698. Women Who Work: Part 2. Queens Printer, Ottawa.

Andrews, F. et al.
1973. Multiple Classification Analysis - a report on a computer program for multiple regression using categorical predictors. University of Michigan, Ann Arbor.

Anicic, Z.
1971 "Certain Indicators of Recent Fertility Trends of Yugoslav Population". International Population Conference, London, 1964. Vol. 1. Liege, IUSSP

Astin, H.
1969. The Woman Doctorate in America. Russell Sage Publication, New York.

Balakrishnan, T. et al.
1975. Fertility and Family Planning in a Canadian Metropolis, McGill-Queens University Press, Montreal.

Balakrishnan, T. et al.
1979. Patterns of Fertility in Canada, 1971. Statistics Canada, Ottawa.

Bancroft, G.
1958. The American Labour Force, John Wiley, New York.

Beaujot, R.
1975. Ethnic Fertility Differentials in Edmonton, unpublished Ph.D. thesis, University of Alberta, Edmonton.

Becker, G.
1960 "An Economic Analysis of Fertility". Demographic and Economic Change in Developed Countries, NBER, Princeton University Press, Princeton.

Beckman, L.
1973. Fertility, Work Status and Perceived Rewards and Costs of Children and Work, Department of Psychiatry, University of California, Los Angeles.

Belloc, N.
1950 "Labor force participation and employment opportunities for women". JASA. 45

Ben-Porath, Y.
1973 "Economic Analysis of Fertility in Israel: Point and Counter Point". Journal of Political Economy. 81.

Blake, J.
1965 "Demographic Science and the Redirection of Population Policy" in M.C. Sheps and J.C. Ridley (eds.) Public Health and Population Change. Pittsburg, University of Pittsburg Press.

Blake, J.
1967 "The Americanization of Catholic Reproductive Ideals". Population Studies. 20

Blake, J.
1968 "Are Babies Consumer Durable?". Population Studies. 22

Bowen, W. and Finegan T.
1965 "Labor force participation and unemployment" in Employment Policy and the labor market, (eds.) A. Ross, University of California Press, Berkeley.

Bowen, W. and Finegan T.
1966 "Educational Attainment and labor force participation". American Economic Review. 65

Bowen, W. and Finegan T.
1969. The Economics of labor force participation. Princeton University Press, New Jersey.

Burch, T.
1966 "The Fertility of North American Catholics: A Comparative Overview". Demography. 3.

Burstein, M. et al.
1975. Canadian Work Values, Manpower and Immigration, Ottawa.

Cain, G.
1966. Married Women in the Labor Force: An Economic Analysis, University of Chicago Press, Chicago.

Caldwell, J.
1965 "Extended Family Obligations and Education: A study of an Aspect of Demographic Transition amongst Ghanian University Students". Population Studies. 19

Caldwell, J.
1967 "Fertility Attitudes in Three Economically Contrasting Rural Regions of Ghana". Economic Development and Cultural Change. 15.

Charles, E.
1948. The Changing Size of Family in Canada. King's Printer, Ottawa.

Cliffor, W.
1971 "Modern and Traditional Value Orientations and Fertility Behaviour: A Social Demographic Study". Demography. 8

Collishaw, N.
1976. Fertility in Canada. Profile Studies, Statistics Canada, Ottawa.

Collver, A.
1968 "Women's Work Participation and Fertility in Metropolitan Areas". Demography. 5

Collver, A. and Langlois
1962 "The Female Labour Force in Metropolitan Areas: An International Comparison". Economic Development and Cultural Change. 10

Dandekar, K.
1967. Communication in Family Planning: Report on an Experiment. Gokhale Institute Studies, 49. Asia Publishing House, Bombay.

Davidson, M.
1977 "Female Work Status and Fertility in Latin America". The Fertility of Working Women, ed. S. Kupinsky, Praeger Publishers, New York.

Day, L.
"Natality and Ethnocentrism: Some relationships suggested by an Analysis of Catholic - Protestant differentials". Population Studies, 22, 27

Dixon, R.
1975 "Women's Rights and Fertility". Report on Population/Family Planning, #17, Population Council, New York.

Driver, E.
1963. Differential Fertility in Central India, Princeton University. New Jersey.

Duessenberry, J.
1960 "Comment". Demographic and Economic Change in Developed Countries, BNER, Princeton University Press, Princeton.

Duncan, O.
1964 "Residential Areas and differential fertility". Eugenics Quarterly, 11

Durand, J.
1946 "Married Women in the Labor Force". A.J.S. 52

Easterlin, R.
1969 "Toward a Socioeconomic Theory of Fertility". Fertility and Family Planning: A World View, ed. S.J. Behrman et al. University of Michigan Press, Ann Arbor.

Farley, J.
1970 "Graduate Women: Career Aspirations and Desired Family Size". American Psychologist. 25

Federici, N.
1968 "The Influence of Women's Employment on Fertility". World View on Population Problems, ed. E. Szabady. Budapest.

Fogarty, M. et al.
1971. Sex, Career and Family. George Allens & Unwin, London.

Fong, M.
1976 "Female Labour Force Participation and Fertility: Some Methodological and Theoretical Considerations". Social Biology.

Fortney, J.
1972 "Achievements as an Alternative Source of Emotional Gratification to Childgearing". Paper presented at the annual meeting of the Population Association of America.

Freedman, R. and Coombs, L.
1966 "Economic Considerations in Family Growth Decision". Population Studies. 13

Freedman, D.
1963 "The Relation of Economic Status to Fertility". American Economic Review. 53

Freedman, R., Whelpton, P. and Campbell A.
1959. Family Planning Sterility and Population Growth. McGraw Hill, New York.

Friedlander, S. and Silver, M.
1967 "A Quantitative Study of the Determinants of Fertility Behaviour". Demography, 4. 30

Gendell, M.
1966 "Fertility Differentials and the Trend of Fertility in Brazil". Paper presented at annual meeting of the Population Association of America.

Glick, P.
1955 "The Life Cycle of the Family". Marriage and Family Living. 17

Goldstein, S.
1972 "The Influence of Labor Force Participation and Education on Fertility in Thailand". Population Studies, 26. 419

Gronau, R.
1973 "The Effect of Children on the Housewife's Value of Time". Journal of Political Economy. 81

Hass, P.
1972 "Maternal Role Incompatibility and Fertility in Metropolitan Latin America". Journal of Social Issues. 28

Hathaway, D., Beegle, J. and Bryant, W.
1969. People of Rural America, Government Printing Press, Washington.

Havens, E. and Gibbs, J.
1975 "The Relation Between Female Labor Force Participation and Fertility: A Theory of Variability". Sociological Methods & Research, Vol. 3, No. 3.

Hawthorn, G.
1970. The Sociology of Fertility, Macmillan, London.

Heer, D.
1964 "Fertility Differences Between Indian and Spanish Speaking Parts of Andan Countries". Population Studies, 26.

Heer, D.
1966 "Economic Development and Fertility". Demography, 3.

Heer, D. and Turner E.
1965 "Areal Differences in Latin American Fertility". Population Studies, 18.

Henripin, J.
1972. Trends and Factors of Fertility in Canada. 1961 Census Monograph, Statistics Canada, Ottawa.

Hoffman, L.
1961 "Effects of Maternal Deprivation on the Child". Child Development. 32

Hoffman, L.
1963 "The Decision to Work" in The Employed Mother in America, ed. F.I. Nye and L.W. Hoffmann, Rand McNally, Chicago.

Hoffman, J. and Hoffman M.
1973 "The Value of Children to Parents". Psychological Perspectives in Population, ed. J. T. Fawcett, Basic Books, New York.

Hull, V.
1977 "Fertility, Women's Work, and Economic Class: A Case Study from Southeast Asia". The Fertility of Working Women, ed. S. Kupinsky, Praeger Publishers, New York.

Johnston, J.
1963. Econometric Methods, McGraw-Hill, New York.

Kelly, J.
1973. Ideology and National Self Interest in Career and Fertility Preferences, Columbia University, New York.

Kiser, C., Grabill, W. and Campbell A.
1968. Trends and Variations in Fertility in the United States, University Press, Cambridge: Harvard.

Klein, V.
1965. Britain's Married Women Workers, Routledge and Kegan, London.

Krotki, K.
1969 "Low Male Wage and High Female Education as Tools of Social Engineering for the Population Problem" invited discussion presented to International Union for the Scientific Study of Population 1969 General Conference, London.

Krotki, K. and Lapierre, E.
1968 "La fecondite au Canada selon la religion, l'origine ethnique et l'etat matrimonial". Population. 23

Kupinsky. S.
1971 "Non-Familial Activity and Socio-economic Differentials in Fertility". Demography. 8

Kupinsky, S.
1977. The Fertility of Working Women: A Synthesis of International Research, Praegen Publications, New York.

Kupinsky, D.
1977 "The Fertility of Working Women in the United States: Historical Trends and Theoretical Perspectives" in The Fertility of Working Women, ed. S. Kupinsky, Praegen Publishers, New York.

Lebergott, S.
1960 "Population Change and the Supply of Labor". Demographing and Economic Change in Developed Countries, Princeton University Press, Princeton.

Levine, A.
1968. Marital and Occupational Plans of Women in Professional Schools: Law, Medicine, Nursing, Teaching. Ph.D. dissertation, Yale University.

Long, C.
1958. The Labor Force under changing income and employment, Princeton University Press, New York.

Madduri, S.
1979. Economic Analysis of Fertility Behaviour in Canada. Ph.D. dissertation, University of Alberta, Edmonton.

Mason, K.
1974. Women's Labor Force Participation and Fertility, RTI, Research Triangle Park, N.C.

Mason, K. and Bumpass L.
1975 "U.S. Women's Sex Role Ideology, 1970". American Journal of Sociology. 80

Mason, K. and Hodgdon, J.
1976 "Career versus Economic Factors in the Tuning of Married Women's First Births". Paper presented at annual meeting of the Population Association of America.

Matsunaga, E.
1967 "Measures Affecting Population Trends and Possible Genetic Consequences". World Population Conference, 1965. United Nations, New York.

Mazur, D.
1968 "Birth Control and Regional Differentials in the Soviet Union". Population Studies. 22

Michael, R.
1973 "Education and the Derived Demand for Children". Journal of Political Economy. 81

Michel, A.
1967 "Comparative Data concerning the Interaction in French and American Families". Journal of Marriage and the Family. 29

Minger, J.
1962 "Labor Force Participation of Married Women". Aspects of Labor Economics, National Bureau of Economic Research, Princeton.

Morgan, J.
1965 "Time Work and Welfare". Patterns of Market Behaviour, ed. M.J. Brennan, Brown University Press, Rhode Island.

Mott, F.
1972 "Fertility, Life Cycle and Family Labor Force Participation in Rhode Island: A Retroactive Overview". Demography. 9

Myrdal, A. and Klein, V.
1956. Women's Two Roles, Routledge and Kegan, London.

Nakamura, A. et al.
1979. Employment and Earnings of Married Females, Statistics Canada, Ottawa.

Namboodiri, N.
1964 "The Wife's Work Experience and Child Spacing". Milbank Memorial Fund Quarterly. 42

Namboodiri, N.
1972 "Some Observations on the Economic Framework for Fertility Analysis". Population Studies. 26

Nye, F. and Hoffman, L.
1963. The Employed Mother in America, Chicago: Rand McNally.

Oppenheimer, V.
1970. The Female Labor Force in the U.S., University of California Press, Berkeley.

Oppenheimer, V.
1974 "The Life Cycle Squeeze: The Interaction of Man's Occupational and Family Life Cycles". Demography. 11

Ostry, S.
1970. The Female Worker in Canada, Queen's Printer, Ottawa.

Presser, H.
1973 "Perfect Fertility Control: Consequences for Women and the Family". Toward the End of Growth in Population in America, ed. C.R. Westoff, Prentice-Hall.

Preston, S. and Richards A.
1975 "The Influence of Women's Work Opportunities on Marriage Rates". Demography. 12

Pringle, R.
1967. The Fertility of Working Wives. National Centre for Health Statistics, Washington, D.C.

Rao, B.
1975. Fertility and Income in Canada, Ph.D. dissertation, University of Alberta, Edmonton.

Ridley, J.
1959 "Number of Children Expected in Relation to Non-Familial Activities of Wife". Milbank Memorial Fund Quarterly. 37

Roberts, G. et al.
1967 "Knowledge and Use of Birth Control in Barbados". Demography. 4

Rosen, B. and Simmons, A.
1971 "Industrialization, Family and Fertility: A Structural-Psychological Analysis of the Brazilian Case". Demography. 9

Ryder, N. and Westoff, C.
1971. Reproduction in the United States, 1965, Princeton University Press, Princeton.

Safilios-Rothschild, C.
1969 "Socio-Psychological Factors Affecting Fertility in Urban Greece: A Preliminary Report". Journal of Marriage and the Family. 31

Safilios-Rothschild, C.
1970 "The Influence of Wife's Degree of Work Commitment upon Some Aspects of Family Organization and Dynamics". Journal of Marriage and the Family. 32

Safilios-Rothschild, C.
1971 "Toward a Conceptualization and Measurement of Work Commitment". Human Relations. 24

Safilios-Rothschild, C.
1972 "The Relationship Between Work Commitment and Fertility". International Journal of Sociology of the Family. 2

Safilios-Rothschild, C.
1977 "The Relationship Between Women's Work and Fertility: Some Methodological and Theoretical Issues". The Fertility of Working Women, ed. S. Kupinsky, Praeger Publications, New York.

Scanzoni, J.
1975. Sex Roles, Life Styles, and Childbearing: Changing Patterns in Marriage and the Family, Free Press, New York.

Schultz, T.
1973 "The Value of Children: An Economic Perspective". Journal of Political Economy. 81

Sobol, M.
1963 "Commitment to Work". The Employed Mother in America, ed. F.I. Nye and L.W. Hoffman, Rand McNally, Chicago.

Spencer, B. and Featherstone, D.
1970. Married Female Labor Force Participation: A Micro Study, D.G.S. Ottawa.

Statistics Canada
1975. Introduction to the Public Use Sample Tapes, data dissemination, Ottawa.

Stolzenberg, R. and Waite, L.
1975 "Age and the Relationship Between Young Women's Plans for Childbearing and Employment". Birth expectations and working plans of young women: changes in role choice, ed. L.E. Suter et al. U.S. Bureau of Census, Washington.

Stycos, J.
1968 "Education and Fertility in Latin America". Human Fertility in Latin America: Sociological Perspectives. Cornell University Press, Ithaca.

Stycos, J. and Back, K.
1964. The Control of Human Fertility in Jamaica, Cornell University Press, Ithaca.

Stycos, J. and Weller, R.
1967 "Female Working Roles and Fertility". Demography. 4

Sweet, J.
1973. Women in the Labor Force, Seminar Press, New York.

Terry, G.
1974 "A Theoretical Explanation of the Relationship Between Fertility and Female Employment". Population Studies. 29

Urlanis, B.
1965 "Dynamics of the Birth Rate in the U.S.S.R. and Factors Contributing To It". World Population Conference, 1965.

Ware, H.
1977 "Women's Work and Fertility in Africa". The Fertility of Working Women, ed. S. Kupinsky, Praeger Publishers, New York.

Weller, R.
1967. Female Work Experience and Fertility in San Juan Puerto Rico. Ph.D. dissertation, Cornell University.

Weller, R.
1968 "The Employment of Wives, Role Incompatibility and Fertility". Milbank Memorial Fund Quarterly. 46

Weller, R.
1969 "Role Conflict and Fertility". Social and Economic Studies. 12

Weller, R.
1976 "Wives Employment and Cumulative Family Size". Paper presented at annual meeting of Southern Sociological Society.

Whelpton, P. et al.
1966. Fertility and Family Planning in the United States, Princeton University Press, Princeton.

Willis, R.
1973 "A New Approach to the Economic Theory of Fertility Behaviour". Journal of Political Economy, Vol. 81, No. 2.

Wolfe, B.
1975 "Interrelations of Fertility and Women's Labor Force Participation with Particular Emphasis on Education". Paper presented at annual meeting of the Population Association of America.

Yaukey, D.
1961. Fertility Differences in a Modernizing Country, Princeton University Press, Princeton.

Young, A.
1973. Children of Working Mothers, March, 1973. Special Labor Force Report #154, Department of Labor, Washington.

Zweig, F.
1952. Women's Life and Labour, London.